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THE UNIVERSITY OF ALBERTA

INCENTIVE MOTIVATION IN SPORT: A THEORETICAL ANALYSIS
AND THE DEVELOPMENT OF A MEASURING INSTRUMENT

by



NANCY L. WOOD

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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THE UNIVERSITY OF ALBERTA
FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies and Research,
for acceptance, a thesis entitled INCENTIVE MOTIVATION
IN SPORT: A THEORETICAL ANALYSIS AND THE DEVELOPMENT OF
A MEASURING INSTRUMENT submitted by NANCY L. WOOD in
partial fulfilment of the requirements for the degree of
Doctor of Philosophy.

Date Sept. 3, 1980.....

ABSTRACT

The primary purpose of the study was to assess the construct validity of The Alberta Incentive Motivation Inventory (IMI). The IMI contains seven subscales assessing excellence, power, stress, independence, success, aggression, and affiliation incentives in sport. A secondary purpose was to determine if differences existed on any of the seven incentive systems for male and female athletes in basketball and swimming.

Subjects who participated in this study were 400 male and female athletes in basketball and swimming. Specifically, the subjects were 200 competitive basketball players--100 of each sex and 200 competitive swimmers--100 of each sex. These subjects ranged in age from 11 to 15 years.

Each athlete completed the IMI and the Personality Research Form E (PRF-E). The PRF-E was used as the major validation instrument. Two major independent statistical analyses were used to examine the construct validity of the IMI. These analyses were: 1) correlational method as outlined by Campbell and Fiske (1959) and 2) principal-axis factoring, varimax rotation, and orthogonal procrustean transformation. Two-way analyses of variance were used to examine group differences on the seven incentive systems.

Based on the correlational method the construct validity of all seven scales of the IMI was acceptable. Based on the factor analytic method the construct validity of all the IMI scales except for the excellence scale was acceptable. Thus, the use of seven and six

scales of the IMI respectively to measure sport-specific constructs across sport groups was supported. The seven scales of the IMI were: excellence, power, stress, independence, success, aggression, and affiliation.

There were no significant differences on the IMI subtests of excellence and stress for male and female athletes in basketball and swimming. Males and females in basketball scored significantly higher on the subtests of independence and aggression than males and females in swimming. Male athletes in basketball and swimming scored significantly higher on the subtests of power, success, and aggression than female athletes in these two sports. As well, female swimmers scored significantly higher on the subtest of success than female basketball players; and male basketball players scored significantly higher on the subtest of aggression than male swimmers. Female basketball players scored significantly higher on the subtest of affiliation than male basketball players. This was the only significant difference on the IMI subtest of affiliation for the four subgroups of athletes.

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TABLE OF CONTENTS

	Page
LIST OF TABLES	xi
LIST OF FIGURES	xvii
Chapter	
I. STATEMENT OF THE PROBLEM	1
Introduction	1
The Problem	3
Hypothesis for Testing the Problem	4
The Sub-Problem	4
Hypothesis for Testing the Sub-Problem	4
Justification for the Study	5
The Motive-Incentive Conundrum	7
Definition of Terms	12
II. REVIEW OF THE LITERATURE	13
Introduction to the Study of Incentive Motivation in Sport	13
Theoretical Frameworks for the Study of the Motivations of Athletes	16
Theoretical Framework for Examining the Incentive Motivation of Athletes	31
Excellence Incentive System	32
Power Incentive System	48
Stress Incentive System	56
Independence Incentive System	66

Chapter	Page
Success Incentive System	71
Aggression Incentive System	78
Affiliation Incentive System	91
III. METHODS AND PROCEDURES	103
PILOT STUDY: INITIAL DEVELOPMENT OF THE INSTRUMENT	103
Purpose of the Pilot Study	103
Description of the Scales	103
Construction of the Scales' Items	105
Format of the Inventory	107
Testing of the Inventory	107
Statistical Analyses of the Scales	108
Descriptive Statistics	108
Reliability	110
Item Analysis	112
Revised Form of the Inventory	116
Summary of the Pilot Study	117
METHODS AND PROCEDURES IN THE PRESENT STUDY	118
Subjects and Sports	118
Construct Validation of The Alberta IMI	120
Reliability of The Alberta IMI	124
The Instruments	125
The Alberta IMI	125
Personality Research Form E (PRF-E)	127
Protocol for Administration of the Instruments	130

Chapter	Page
Experimental Design of the Sub-Problem	131
Statistical Treatment of the Data	132
IV. RESULTS AND DISCUSSION	133
Subjects and Sports	133
Construct Validity of The Alberta IMI	136
Evaluation of Construct Validity of the IMI by Campbell and Fiske Criteria	137
Evaluation of Construct Validity of the IMI by Principal-Axis Factoring, Varimax Rotation, and Orthogonal Procrustean Transformation	163
Principal-Axis Factoring and Varimax Rotation	164
Orthogonal Procrustean Transformation	178
Comparison of the Two Major Analyses Used to Evaluate the Construct Validity of the IMI	187
Reliability of The Alberta IMI	191
Internal Consistency	191
Test-Retest Reliability	193
Comparison of the IMI Subtest Scores	197
Mean Scores of Incentive Systems	197
Differences Within Each Incentive System	197
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY	208
Summary	208
Conclusions	209
Recommendations for Further Study	210

Chapter	Page
BIBLIOGRAPHY	212
Appendix A: THE ALBERTA IMI	224
Appendix B: INTERCORRELATIONS OF MULTI-INCENTIVE- MULTIMETHOD MATRICES (IMI WITH PRF-E)	229
Appendix C: FACTOR LOADING MATRICES FROM ORTHOGONAL PROCRUSTEAN TRANSFORMATIONS	234
Appendix D: SUMMARIES OF THE TWO-WAY ANALYSES OF VARIANCE AND THE SCHEFFÉ CONTRASTS ON THE IMI SUBTESTS	237
Appendix E: SUMMARY OF THE TWO-WAY MULTIVARIATE ANALYSIS OF VARIANCE AND THE MULTIPLE COMPARISONS ON THE IMI SUBTESTS	242

LIST OF TABLES

Table	Page
1. Characterizations of the Seven Scales Comprising the Inventory	104
2. Athletes Tested on the Inventory	108
3. Means and Standard Deviations of Incentive Scales for the Groups of Athletes Tested	109
4. K-R 20 Reliability Coefficients of Incentive Scales for the Groups of Athletes Tested	111
5. Breakdown by Scales of Revisions to Items for the Revised Form of the Inventory	116
6. Convergent and Discriminant Validation by a Multi-Incentive-Multimethod Matrix of Intercorrelations	122
7. Distribution by Age, Sex, and Sport of Athletes Tested	133
8. Distribution by Age, Sex, and Sport of Athletes Tested Once and Athletes Tested on a Test- Retest	136
9. Validity Coefficients of the Seven IMI Scales with Respective PRF-E Scales for All Subjects (n = 400)	138
10. Validity Coefficients of the Seven IMI Scales with Respective PRF-E Scales for Male Basketball Players	140
11. Validity Coefficients of the Seven IMI Scales with Respective PRF-E Scales for Female Basketball Players	141
12. Validity Coefficients of the Seven IMI Scales with Respective PRF-E Scales for Male Swimmers	142
13. Validity Coefficients of the Seven IMI Scales with Respective PRF-E Scales for Female Swimmers	143

Table	Page
14. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Heteromethod Correlations for All Subjects	146
15. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Heteromethod Correlations for Male Basketball Players	147
16. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Heteromethod Correlations for Female Basketball Players	147
17. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Heteromethod Correlations for Male Swimmers	148
18. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Heteromethod Correlations for Female Swimmers	148
19. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Monomethod Correlations for All Subjects	151
20. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Monomethod Correlations for Male Basketball Players	152
21. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Monomethod Correlations for Female Basketball Players	152
22. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Monomethod Correlations for Male Swimmers	153
23. Incidence of Validity Coefficients (IMI with PRF-E) Being Greater Than and Less Than Respective Heteroincentive-Monomethod Correlations for Female Swimmers	153

Table	Page
24. Scales of the IMI Whose Intercorrelations were $ \geq .3 $ of Greater in the Heteroincentive-Monomethod Triangle and the Corresponding Heteroincentive-Heteromethod Triangles	157
25. IMI Scales Not Satisfying the Requirements of the Respective Criteria 1, 2, 3, and 4	159
26. Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for All Subjects and For Each Subgroup	165
27. Descriptions of Varimax Rotations of the Scales of the IMI and PRF-E for All Subjects and for Each Subgroup	168
28. Factor Loading Matrices from Varimax Rotations of the Scales of the IMI and the PRF-E for All Subjects	169
29. Factor Loading Matrices from Varimax Rotations of the Scales of the IMI and the PRF-E for Male Basketball Players	170
30. Factor Loading Matrices from Varimax Rotations of the Scales of the IMI and the PRF-E for Female Basketball Players	171
31. Factor Loading Matrices from Varimax Rotations of the Scales of the IMI and the PRF-E for Male Swimmers	172
32. Factor Loading Matrices from Varimax Rotations of the Scales of the IMI and the PRF-E for Female Swimmers	173
33. Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix and Target Matrix (PRF-E) for All Subjects	179
34. Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix for Male Basketball Players and the Target Matrix (IMI Varimax Factor Loading Matrix for All Subjects)	181
35. Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix for Female Basketball Players and the Target Matrix (IMI Varimax Factor Loading Matrix for All Subjects)	182

Table	Page
36. Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix for Male Swimmers and the Target Matrix (IMI Varimax Factor Loading Matrix for All Subjects)	182
37. Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix for Female Swimmers and the Target Matrix (IMI Varimax Factor Loading Matrix for All Subjects)	183
38. Summary of Interpretations of Rotations of IMI Factor Structure for Each Subgroup to the IMI Factor Structure for All Subjects	184
39. Alpha Coefficients of the Seven IMI Scales for the Groups of Athletes Tested	191
40. Test-Retest Reliability Coefficients of the Seven IMI Scales for All Subjects (n = 200)	193
41. Test-Retest Reliability Coefficients of the Seven IMI Scales for Male Basketball Players (n = 50)	194
42. Test-Retest Reliability Coefficients of the Seven IMI Scales for Female Basketball Players (n = 50)	194
43. Test-Retest Reliability Coefficients of the Seven IMI Scales for Male Swimmers (n = 50)	195
44. Test-Retest Reliability Coefficients of the Seven IMI Scales for Female Swimmers (n = 50)	195
45. Means and Standard Deviations of the Seven IMI Subtests for the Four Subgroups of Athletes	198
46. Intercorrelations of IMI and PRF-E Scales for All Subjects	229
47. Intercorrelations of IMI and PRF-E Scales for Male Basketball Players	230
48. Intercorrelations of IMI and PRF-E Scales for Female Basketball Players	231
49. Intercorrelations of IMI and PRF-E Scales for Male Swimmers	232
50. Intercorrelations of IMI and PRF-E Scales for Female Swimmers	233

Table	Page
51. Factor Loading Matrix from Orthogonal Procrustean Transformation of IMI Scales for All Subjects	234
52. Factor Loading Matrix from Orthogonal Procrustean Transformation of IMI Scales for Male Basketball Players	234
53. Factor Loading Matrix from Orthogonal Procrustean Transformation of IMI Scales for Female Basketball Players	235
54. Factor Loading Matrix from Orthogonal Procrustean Transformation of IMI Scales for Male Swimmers	235
55. Factor Loading Matrix from Orthogonal Procrustean Transformation of IMI Scales for Female Swimmers	236
56. Summary of Two-Way Analysis of Variance on the IMI Subtest of Excellence	237
57. Summary of Scheffé Contrasts on Sport x Sex Interaction Means for the IMI Subtest of Excellence	237
58. Summary of Two-Way Analysis of Variance on the IMI Subtest of Power	238
59. Summary of Two-Way Analysis of Variance on the IMI Subtest of Stress	238
60. Summary of Two-Way Analysis of Variance on the IMI Subtest of Independence	238
61. Summary of Two-Way Analysis of Variance on the IMI Subtest of Success	239
62. Summary of Scheffé Contrasts on Sport x Sex Interaction Means for the IMI Subtest of Success	239
63. Summary of Two-Way Analysis of Variance on the IMI Subtest of Aggression	240
64. Summary of Scheffé Contrasts on Sport x Sex Interaction Means for the IMI Subtest of Aggression	240

Table	Page
65. Summary of Two-Way Analysis of Variance on the IMI Subtest of Affiliation	241
66. Summary of Scheffé Contrasts on Sport x Sex Interaction Means for the IMI Subtest of Affiliation	241
67. Summary of Two-Way Multivariate Analysis of Variance on the IMI Subtests	242
68. Summary of Multiple Comparisons of the IMI Subtests for A (Sport) Main Effect	242
69. Summary of Multiple Comparisons of the IMI Subtests for B (Sex) Main Effect	243
70. Summary of Multiple Comparisons of the IMI Subtests for Sport x Sex Interaction Effect	243

LIST OF FIGURES

Figure	Page
1. Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for All Subjects	165
2. Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for Male Basketball Players	166
3. Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for Female Basketball Players	166
4. Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for Male Swimmers	167
5. Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for Female Swimmers	167
6. Sport x Sex Interaction Means for the IMI Subtest of Excellence	199
7. Sport x Sex Interaction Means for the IMI Subtest of Success	200
8. Sport x Sex Interaction Means for the IMI Subtest of Success	200
9. Sport x Sex Interaction Means for the IMI Subtest of Aggression	201
10. Sport x Sex Interaction Means for the IMI Subtest of Aggression	202
11. Sport x Sex Interaction Means for the IMI Subtest of Affiliation	203

Chapter I

STATEMENT OF THE PROBLEM

Introduction

The study of human motivation is the study of the determinants of human behavior. It is the study of why individuals behave as they do. Within this context, it can easily be appreciated that motivation as a concept has no specifically delineated definition. Motivation is only defined within the specifics of an individual study. This was emphasized by Young (1961) who expressed that "it seems that almost any psychologist can discuss almost any topic and bring it within the broad context of motivation" (p. 596).

The explanation of what motivates individuals to participate in competitive sports presents the same degree of complexity as is involved in investigating motivations of all human behaviors. One approach to the examination of the motivations of athletes is to assess what goals individuals perceive as available as a consequence of their participation in sport, and how attractive these goals are to them (i.e., the incentive value of these goals). Thus, it is hypothesized that the incentive value of various goals that individuals perceive as available partially determine their motivation to participate in competitive sport. The construct that underlies this approach to the study of the motivations of athletes has been termed INCENTIVE MOTIVATION IN SPORT.

The starting point for attempting to determine the goals available to athletes within sport settings was an examination of the

paradigm of human motivation presented by Birch and Veroff (1966). They postulated that seven major incentive systems--sensory, curiosity, affiliative, aggressive, achievement, power, and independence--account for most of an individual's significant recurrent instrumental (goal-directed) and consummatory (goal) behaviors. They further noted that these incentive systems were made up of a network of motivational variables--a motive, the incentive itself, and related goal activities and consummatory values.

Their comprehensive paradigm of human motivation in general situations lends itself readily to adaptation in specific situations such as sport. However, to allow for the evaluation of these incentive systems in sport, two modifications of the seven incentive systems as put forth by Birch and Veroff (1966) were carried out.

The first modification consisted of fractionating the Birch and Veroff (1966) achievement system into two components labelled excellence and esteem. They viewed the achievement system as asocial--that is, other people were only incidental to the outcomes sought. However, achievement can be drawn into action by powerful social motives (e.g., Burton, 1971; Costello, 1967; Kagan and Moss, 1962). Thus achievement can be social (i.e., other people are essential to the outcomes sought) as well as asocial. The social aspect of achievement revolves around social success--that is, status, prestige and recognition; this component of achievement was labelled the esteem incentive system. With asocial achievement, individuals are motivated to the pursuit of excellence without depending on the recognition, status, and prestige for such accomplishment. This component of

achievement was appropriately labelled the excellence incentive system.

The second modification consisted of a merging of Birch and Veroff's (1966) sensory and curiosity incentive systems into one system labelled arousal. The rationale for this modification came essentially from the literature on stimulus seeking in sport and physical activity (e.g., Donnelly, 1978; Ellis, 1973). The basic premise of this literature is that individuals have a need for an optimal level of stimulation; and consequently, participation in sport is one avenue for seeking to attain and maintain this optimal stimulation level.

Thus it was hypothesized that competitive sports participation lies within seven major incentive systems: excellence, power, stress, independence, success, aggression, and affiliation. As a result of a pilot study (see Chapter III) the esteem and arousal incentive systems were relabelled success and stress respectively.

THE ALBERTA IMI¹ was designed to evaluate the construct of incentive motivation in sport. That is, it was designed to determine the incentive value of the goals as defined by the seven major incentive systems available to athletes.

The Problem

The purpose of the present study was to develop an instrument to measure the incentive motivation within seven major incentive systems of athletes. More specifically, the primary purpose was to assess the

¹This official title stands for The Alberta Incentive Motivation Inventory. Hereafter, it may be referenced by its acronymic form, IMI.

construct validity of the IMI.

Hypothesis For Testing the Problem

The major hypothesis of this study was that the IMI which contains subscales assessing excellence, power, stress, independence, success, aggression, and affiliation incentives is a measure of the incentive motivation of athletes.

The basis for determining whether the IMI did in fact measure the incentive motivation of athletes was obtained via two major independent statistical analyses. These analyses were: 1) correlational method as outlined by Campbell and Fiske (1959) and 2) factor analysis.

The Sub-Problem

If the construct validity of the IMI was adequately established, then a sub-problem would be investigated. The purpose of the sub-problem was to determine if differences existed in incentive motivation on any of the seven incentive systems for male and female athletes in the sports of basketball and swimming.

Hypothesis For Testing the Sub-Problem

As this was an exploratory study with a new instrument and since there was no previous evidence to draw from, there was no basis for a priori hypotheses. Therefore, for the purpose of investigating the sub-problem, the following null hypothesis was tested:

1. No significant differences will exist in incentive motivation on any of the seven incentive systems as measured by the IMI for male and female athletes in the sports of basketball and swimming.

Justification for the Study

The justification for this study centered around two major dimensions. The first dimension was concerned with measuring instruments in the psychology of sport area and, specifically for the purpose of this study, measuring instruments that examined the motivations of athletes. The second dimension was the projected practical applications of the inventory.

Nunnally (1970) must have been thinking of the psychology of sport area when he noted that "it can be argued persuasively that obtaining adequate measurement methods is the major problem in the science of psychology" (p. 3). This statement is very applicable to the psychology of sport area. The majority of studies in this area have used general psychological instruments which are invalid for obtaining accurate and consistent information in sport situations. The prolific literature specifically concerned with sport personology has resulted in very few answers and considerable equivocality and is the most obvious evidence in support of this statement. Martens (1975) provides a good evaluation of the status of this sport personality research.

Specificity of the situation is too important a factor to be ignored when assessing psychological dimensions of individuals in sport. Little effort has been made to provide any theoretical

frameworks within which to study the motivations of athletes, let alone efforts to develop instruments which could measure these constructs. There is a justifiable need for the development of sport-specific constructs and instruments to measure these constructs to better understand the behavior of individuals in sport situations. There is considerable support for the usefulness of developing instruments to measure constructs in specific situations (e.g., Birrell, 1978; Edmunds, 1978). The IMI was designed to evaluate sport-specific motivations of athletes.

The second major justification for the study was the projected practical applications of the worth of the inventory (i.e., the value of the inventory to both athletes and coaches). Successful coaching and successful participation in competitive sport are largely determined by how effectively the coach and athlete interact. The inventory might provide the basis for this effective interaction. A valid inventory would aid in an explanation of why individuals compete in competitive sport. The coach and athlete would be provided with information on the strength of certain incentive systems for the athlete and on which incentives are most salient for the athlete. Information on why individuals are participating in competitive sport would lend itself to more meaningful interactions with each individual athlete.

And, most importantly, utilization of information from the inventory might make it possible for athletes to be provided with, and reinforced for, the experiences they are seeking in their sport involvement. As a consequence, dropouts from competitive sport may significantly decrease.

The Motive-Incentive Conundrum

A persistent problem in psychology generally and in psychology of sport specifically has been the lack of universally accepted definitions for often-used psychological terms. The state of the research in the area or perhaps the nature of the area itself has mitigated against this happening. Whatever the reason, the lack of distinctive meanings for several psychological terms has resulted in their being used by either trained psychologists or lay persons without a clear understanding of expressed intent. Each time the terms are used it becomes necessary to operationally define them anew. It is no exaggeration to suggest that a thesaurus of psychological terms would be a handy aid for any psychologist.

For this present study, it was felt necessary to define the terms motive and incentive as well as to provide an explanation of their interrelationship.

A motive has been defined by Birch and Veroff (1966) as " . . . a relatively stable disposition of the organism, a part of an individual's personality, and, as such, calls for assessment rather than manipulation" (p. 28). Motives as presented by Birch and Veroff were what Jackson (1974) labelled personality traits when talking about the Personality Research Form (PRF). Jackson designed the various forms of the PRF to yield a set of scores for personality traits that were relevant to the functioning of individuals in a wide variety of situations.

Birch and Veroff (1966) expressed that " . . . an incentive defines the character of a goal activity, which in turn is the basis

for goal-directed activity" (p. 14). Particular outcomes of actions have incentive value to the individual. The incentive value that an individual attaches to consequences of actions partially determine the courses of action the individual will choose to engage in. An individual is attracted to engage in goal-directed actions that lead to outcomes with positive incentive value and, conversely, is not attracted to engage in actions that lead to outcomes with negative incentive value.

Although the incentive value of an outcome of action is an important determinant of the strength of a goal-directed tendency, incentives alone do not determine attraction to a goal. An individual's attraction to the outcome of a given action also depends on the individual's experience with the more general class of incentives that the particular outcome represents. The strength of attraction or repulsion to this general class of consequences is called the motive for that class. Motives are modifiers of incentives. That is, if the incentive value of a given outcome is of a certain absolute strength, it is more attractive to an individual with a high motive for that consequence and less attractive to an individual with a low motive for that consequence (Birch and Veroff, 1966).

It is often difficult to get an absolute measure of the incentive value of a given object, event, or course of action for an individual. Research on incentive value has been primarily restricted to controlled animal research in the laboratory where it is relatively easy to assess the incentive value of various goals. For example, a researcher speaks of the incentive value of x number of food pellets

under specified conditions. However, for given life situations some modifications are required to assess the incentive value of various goals. It would be unmanageable to focus on such specific incentives for each situation that arises in day-to-day existence. To account for day-to-day behavior, it is necessary to define general incentives which operate in countless specific situations (Birch and Veroff, 1966).

To the researcher studying incentive value, the most significant goal activities are those that can be controlled and varied systematically. However, there are few examples of systematic manipulations of incentive value when studying human behavior. Money and successful performance have been used most commonly as incentives. Generally speaking, it would be of value to know the incentive value of, for example, playing on a basketball team but it is difficult according to Birch and Veroff (1966) to make such an assessment. And further, they argued that even if these incentive values were found, it would be difficult to vary them experimentally.

The affiliation incentive system is used to illustrate the relationship of incentives within this system to the underlying motive within the affiliation incentive system. An explanation is provided which rationalizes the measurement of the incentive value that an individual places on specific goals within the affiliation incentive system. As well, the rationale for the measurement of an individual's motive strength for goals within the affiliation incentive system is given.

Firstly, to measure an individual's motive strength for affiliation, 10 items could be devised measuring affiliation in 10 different

situations. The total score resulting from the individual rating each of the items on some scale would yield a measure of an individual's motive strength for affiliation. However, each item taken individually is a measure of the incentive value an individual places on affiliation in a specific situation. To obtain a more accurate measure of the incentive value that an individual places on affiliation in a specific situation, the one item that measures affiliation in a specific situation could be extended to 10 items. Now the score resulting from an individual rating these 10 situation-specific items would be a measure of the incentive value that an individual places on affiliation in that specific situation.

In this study, the specific situation studied was sport. Affiliation incentives in sport were characterized by the opportunities for the athlete to attain, maintain, and consolidate warm, interpersonal relationships (primarily with other athletes and coaches) (Alderman and Wood, 1976). Ten items of the IMI were designed to measure affiliation incentives in sport. It was felt that the total score of these ten items resulting from an individual rating each of the items yielded a measure by that individual of incentive value for affiliation incentives in sport.

The more general class of incentives that the affiliation incentives in sport represent is a measure of an individual's motive for that class of incentives. That is, it is appropriate to speak of motive when all situations are being considered. That is, motives are not situation-specific; they are applicable to all situations. Conversely, incentives are specific to a situation--herein, sport-

specific incentives. If you like, first-order motives are not situation-specific whereas incentives or second-order motives are situation-specific. Different settings for affiliation would have different incentive values. The incentive value that an individual places on affiliation incentives in sport are partially influenced by the strength of that individual's motive for affiliation.

It is reasonable to expect a low to moderate correlation to exist between the motive strength an individual has for a specific incentive system and the corresponding incentive values that the individual attaches to specific goals within that system. For this particular study, it is predicted that a low to moderate correlation should exist between an individual's motive strength (trait strength) as measured by Jackson's (1974) PRF-E scales and the incentive value an individual placed on the incentives in sport as measured by the IMI.

It was felt that these measures of sport-specific incentives provided more useful and accurate information than general measures of individual's motives. In a personal communication with Veroff (September, 1978) he stated that the strength of an incentive has to be operationalized in terms of the setting. This statement raises an important point as to the optimal degree of specificity that is necessary to provide sufficiently accurate but still useful information that will provide a desirable level of generalizability. Is the IMI sufficiently specific to study incentives in sport or will it be necessary to study the incentives more specifically within sport or to develop scales measuring incentives specific to a sport? An answer cannot be given at this time as to the optimal degree of specificity that will balance accuracy of information with usefulness of information.

Definition of Terms

1. Construct--a theoretical concept that has been systematically defined to interpret the psychological meaning of the score an individual attains on a test (Cronbach, 1970).

2. Construct Validity--the extent to which a test may be said to measure a theoretical construct. Only through evidence accumulated as a result of many studies can the construct validity of a test be evaluated.

3. Incentive--" . . . an incentive defines the character of a goal activity, which in turn is the basis for goal-directed activity" (Birch and Veroff, 1966:14). The incentives identified as available in sport were categorized into seven major incentive systems. The distinctive qualities or characteristics of the goal activity of each of these seven incentive systems are defined by these specific incentives.

4. Incentive Motivation in Sport--a construct that is used to describe the motivation an athlete has to participate in sport resulting from the incentive values that are attached to various goals perceived as available through participation in sport.

5. Incentive Value--the positive or negative value that an individual attaches to possible outcomes of actions. The incentive value that an individual attaches to these possible goals partially determines the courses of actions the individual chooses to engage in. That is, an individual is attracted to engage in goal-directed actions that lead to outcomes with positive incentive value and, conversely, is not attracted to engage in actions that lead to outcomes with negative incentive value (Birch and Veroff, 1966).

Chapter II

REVIEW OF THE LITERATURE

Introduction to the Study of Incentive Motivation in Sport

The study of motivation is the study of a complex psychological phenomenon. Motivation as a concept is interpreted only in very general terms. The selection, intensity, and persistence of behavior lie within the scope of motivation (Atkinson, 1964; Beck, 1978; Birch and Veroff, 1966). That is, the study of motivation attempts to explain why an individual selects certain activities, why certain activities are pursued with more intensity than others, and why some activities persist in the face of direct competition from other activities. In light of the broad scope of this concept, it is not surprising that "in psychology and several of the other behavioral sciences, the twentieth century or at least the first half of it, may almost be termed the 'motivational decades' " (Cofer, 1972:2).

Cofer (1972) further noted:

A way of characterizing human motivation . . . is to discuss it in terms of goals or objectives. One can also speak in terms of drives, needs, or motives, but . . . the presence of goals or goal objects is often an important if not the most important condition which leads us to use terms like need or motive. Since goal objects are incentives, we may say that an account of human motivation based on incentives is a natural or plausible one. (p. 92)

Although several human incentive systems have been studied extensively in isolation, the paradigm of human motivation developed by Birch and Veroff (1966) in which seven incentive systems were postulated to account for most of an individual's significant recurrent

(goal-directed) and consummatory (goal) behaviors is most applicable for adaptation to specific situations such as sport. These seven incentive systems were: sensory, curiosity, affiliative, aggressive, achievement, power, and independence. Birch and Veroff (1966) suggested that these incentive systems were made up of a network of motivational variables--a motive, the incentive itself, and related goal activities and consummatory values.

The designation of seven incentive systems was justified on the basis that each of these incentive systems had been manipulated in research studies, and that each incentive system plays a role in the developmental problems faced by all individuals during their lives. They noted that psychologists generally agree that individuals typically face developmental problems of: "regulating their bodily experience" (sensory incentive system); "reacting to new stimuli" (curiosity incentive system); "depending on contact with others" (affiliative incentive system); "reacting to frustration by others" (aggressive incentive system); "evaluating their own performance" (achievement incentive system); "withstanding influence by others" (power incentive system); and "operating on their own" (independence incentive system) (Birch and Veroff, 1966:42). For a detailed discussion of each of these seven incentive systems and their application to the study of behavior in competitive sport, the reader is referred to a paper by Alderman (1974).

The basic premise of the Birch and Veroff (1966) paradigm is that they assumed a principle of action which states that within any individual, at any given moment in time, there exists a number of

competing behavioral tendencies toward relatively independent courses of action. When an individual is motivated to do something, it is the strongest of these set of competing tendencies that wins out and is expressed in overt behavior.

Birch and Veroff (1966) identified four sources of effect on goal-directed behaviors: availability, expectancy, incentive, and motive; and then suggested that "employing these determinants, we will take into account the fact that although the environment of an organism shapes courses of action, the characteristics of the organism itself modify environmental inputs" (p. 5). Thus, the activities that an individual engages in are influenced by the particular situations (availability); what the individual expects to derive from the activities (expectancy); the various incentive values that the individual attaches to the activities (incentive); and the individual's basic motives underlying these activities (motive).

The approach taken in this dissertation to the study of the motivations of athletes was through the construct of incentive motivation in sport, and the designation of seven major incentive systems that were felt to account for competitive sports participation. The literature most directly relevant dealt with components of these major incentive systems. A considerable amount of research has been conducted on the motives that are part of these incentive systems and very little research has been carried out on the other motivational variables that make up the systems. However, it would be unwieldly to present the research for the underlying motive for each system. Also, the major interest in the present study was not on the

motives per se but on the incentive value that individuals attached to the goal activity of each system. However, research on incentive value has been primarily restricted to controlled animal research in the laboratory. Therefore, it was necessary to selectively review the literature on the motive underlying the incentives of each system.

The remaining literature review is subdivided into two areas. The theoretical frameworks that have been developed to study the motivations of athletes comprise one section. The second and more critical area of concern is the specific theoretical framework that has been proposed for the present study to examine the motivations of athletes. The seven incentive systems that were hypothesized to account for competitive sports participation are reviewed.

Theoretical Frameworks for the Study of the Motivations of Athletes

Appreciating the broad context of the term motivation, it is not difficult to find numerous studies that have investigated the motivations of athletes. Almost any study can fall under the umbrella of motivation. A large number of these studies on sport involvement of individuals at all age levels and all participation levels have primarily used personality as the vehicle for examining motivations. Also, these studies have measured almost exclusively general personality motives through the use of general personality inventories and from these motives have explained the specific motivations of athletes. As has also been the case in psychology generally, the motive that has received the most attention has been achievement motivation (Birrell,

1978 provided a review of achievement motivation research in sport).

Unfortunately, attempts at structuring theoretical frameworks from which to study the motivations of athletes have been limited. This was emphasized by Berlin (1974) who suggested that " . . . the sport literature is devoid of motivation information that adequately acknowledges antecedents to sport entry and athletes' sustained commitment to the competitive sport scene . . . the study of sport motivation is in the stages of infancy" (p. 331). Berlin (1974), Butt (1979), and Watson (1976) have attempted to provide theoretical frameworks for studying the motivations of athletes.

Berlin (1971, 1973, 1974) proposed a theoretical model to explain the motivations of collegiate women athletes. She used the theory of achievement motivation (Atkinson, 1964) as the frame of reference for her research. A Q-sort of statements was used to empirically test the theory. The statements represented one of three basic motive categories (mastery, dynamic interaction, and self-regard). From a factor analysis of the Q-sort responses, Berlin (1974) identified five factors that were perceived by collegiate women athletes as motivating effects of competitive sport involvement. The five factors she identified were: 1) "the experience of stress," 2) "maneuvering for accomplishment," 3) "the gratification of certain role interests," 4) "the consequences of affiliation," and 5) "the satisfaction of adjustment and recognition" (Berlin, 1974:351). It was these five factors of Berlin's model that were most directly relevant to the present study.

However, Berlin (1979) in personal communication indicated that

in the ongoing testing of the model the five factors did not hold up and were discarded. She went on to say that the basic structure of the model (in its present stage of development) is composed of three major incentive systems: 1) Mastery--those behaviors and effects relevant to skill aspects of sport participation, 2) Self-Regard--those behaviors and effects directed toward the individual, and 3) Situational--those effects which mediate mastery and self-regard. She further noted that the model also includes three elements of control of reinforcement--internal reinforcement, chance reinforcement, and reinforcement from powerful others. Berlin (1979) also stated that the last testing of the model is now being carried out.

Butt (1979) proposed a theoretical model of sport motivation as evolving on four levels: biological, psychological, social, and secondary reinforcement. The biological and secondary reinforcement levels provided the major influences in energizing and shaping behavior respectively. The reinforcements could be extrinsic--recognition, prizes, and status, or intrinsic--feelings of well-being, personal growth and good self-esteem.

Psychological motivation was represented by the three models of aggression, conflict, and competence. The aggressive motivated athlete was described as active and impulsive, and if frustrated could physically or verbally attack others. The competence motivated athlete was oriented toward maturity and self-insight. Satisfaction in sport was gained through intrinsic feedback from skill development and mastery. The conflict motivated athlete was described as being unhappy, often complaining and always having excuses for behavior.

Although Butt (1979) noted that these three psychological constructs did not completely cover psychological motivation for sport, she contended that they covered the most important personal behaviors manifested in sport.

The constructs of competition and cooperation comprised the social motivation dimension of Butt's model. Competition motivation was described as the desire to defeat others while seeing others as essential and desirable partners in sport identified cooperation motivation. Butt (1979) further hypothesized that aggression and conflict motivation were most likely to lead to competitive social motivation whereas competence motivation was most likely to result in cooperative social motivation. She also hypothesized that athletes motivated by aggression and conflict would be attracted by external rewards of sport while those athletes motivated by competence would be attracted by intrinsic rewards.

Butt (1979) reported on the development of scales to measure the three psychological constructs and the two sociological constructs. Each construct was measured by five-item self-report scales modelled after successful measures of mood states--positive and negative affects. The scales were administered to 188 subjects--115 university students having an average age of 23 years and involved in recreational activities such as jogging, tennis, skiing, and ice hockey; and 73 competitive swimmers with an average age of 12 years.

Mean scores were all approximately at 2.5 (on a scale from 0 to 5) except for competition in females (mean of 1.7) and cooperation in males and females (means of 3.8 and 3.3 respectively). Split-half

reliabilities ranged from a low of .43 on aggression for females to a high of .75 on competition for females. Stability coefficients of the scales using responses from 35 males and females after a two-week interval ranged from .50 (competence) to .80 (conflict).

Butt (1979) maintained that scale intercorrelations supported the model as the degree of correlation in each case was in the predicted direction. Significant correlations were reported between: aggression and competition ($r = .25$ and $.43$), aggression and cooperation ($r = .26$), conflict and competition ($r = .44$ and $.42$), and competence and cooperation ($r = .35$ and $.33$). She also reported that the correlations of these five scales with external tests added further support to the constructs being measured.

Butt (1979) insisted that aggression, conflict, and competition motivations should be discouraged as sport motivations and competence and cooperation motivations should be encouraged. She suggested that her conclusion was supported by the generally negative self-portraits of the subjects with the first three constructs and that psychological competence and social cooperation as sport motivations were highly desirable according to the perspectives provided by the subjects.

Watson (1975, 1976) noted that four major interpretations have been derived from the literature related to the socialization function of children's games to explain the attraction of children's games:

- 1) Social Reciprocity, 2) Intrinsic Motivation (autotelic behavior),
- 3) Achievement Mastery, and 4) Extrinsic Reward.

The first three of these interpretations have been identified as the intrinsically rewarding properties of games while the fourth interpretation is

obviously identified as the extrinsically rewarding property of games. Using little league baseball players, Watson (1975, 1976) examined the extent to which children's games retain their attraction through the intrinsically rewarding properties of games as compared to the extent to which the attraction becomes extrinsic through the effects of institutionalization.

Data were obtained from observations of the players and interviews with the players. Using a 27-item instrument designed from statements given during the interviews as well as other elements observed to be of significance, the players also rated selected game variables.

Responses from interviews were categorized according to the four literature interpretations. References to team membership, playing with friends, and group cooperation directed towards game outcomes were categorized under social reciprocity. References made to fun, excitement, and involvement in the game for the pleasure it provides were grouped under intrinsic motivation. Achievement mastery was the interpretation given to references made to the learning, application, or mastery of game skills and strategies. Extrinsic reward was the interpretation given to references made to the influence of adults in game performance, payment for successful performance, and accessibility of material properties including uniforms and equipment (Watson, 1976).

Through the application of the interpretations of the attraction of games extant in the literature to data obtained via two methods (player interviews and ratings of selected game variables), the order

(from high to low) of the attraction of children's games was: intrinsic motivation, achievement mastery, social reciprocity, and extrinsic reward. The three intrinsic elements of the game had substantially stronger attractions than the attraction of extrinsic forms of reward.

Kenyon (1968a, 1968b) constructed a multidimensional model to characterize physical activity as a sociopsychological phenomenon. Physical activity was defined as "organized (structured), nonutilitarian (in an occupational or maintenance sense), gross human movement usually manifested in active games, sports, calisthenics, and dance" (Kenyon, 1968a:97). Kenyon (1968a) postulated six subdomains to represent the perceived instrumental value of physical activity for individuals:

1. Physical activity as a social experience--those activities which provide the opportunity to meet new people and to maintain existing relationships;

2. Physical activity for health and fitness--those activities in which participation contributes to improved health and fitness;

3. Physical activity as the pursuit of vertigo--those activities which provide, at some risk to the participants, the opportunity for excitement and thrill;

4. Physical activity as an aesthetic experience--those activities which are perceived to possess beauty and artistic qualities;

5. Physical activity as catharsis--those activities which provide for, through vicarious means, the release of tension precipitated by frustration;

6. Physical activity as an ascetic experience--those activities which require long, strenuous, and often painful training and difficult competition that often demand a deferment of many gratifications. Kenyon noted that these six subdomains did not exhaust the entire domain of physical activity and may, in fact, only present a few of the actual dimensions.

Kenyon (1968a, 1968b) designed Likert-type attitude statements to represent each of the six subdomains (14 items per subdomain). Separate inventories were developed for males and females. Data were collected from college freshmen—353 males and 213 females. Hoyt's analysis of variance was used to measure internal consistency. Reliabilities ranged from .72 to .89 for the six scales.

An incomplete image analysis and an oblique rotation of the first six factors were used to test the structural integrity of the model. Clusters of items corresponded to each of the six postulated subdomains (loadings $\geq .30$). Although the six subdomains were relatively independent of each other, the factors of catharsis, health and fitness, and ascetic were the most strongly correlated. The social and aesthetic factors showed the greatest independence (Kenyon, 1968a).

Scale scores differentiated between high and low preference groups, for preferred types of activities, for all scales except catharsis. Subjects ranking a particular type of activity either first or second out of six possibilities were assigned to the high preference group and those ranking the same activity fifth or sixth were assigned to the low preference group (Kenyon, 1968b).

Alderman (1970) studied the attitudes of 136 Canadian athletes (81 males and 55 females) during the 1967 Pan-American Games. The athletes represented a total of 10 different sports including basketball, swimming, track and field, volleyball, and water polo. The attitude inventory containing 48 response items was based on the subdomain conceptual framework developed by Kenyon (1968a). Athletes rated each of the six subdomains against a series of eight descriptive, semantic differential scales each based on a seven-alternative Likert-type attitude statement format. Athletes rated the meaning each subdomain had for them with respect to their attitudes toward physical activity.

Results indicated that male and female athletes were very similar in their attitudes toward physical activity. Both groups rated physical activity as an aesthetic experience as having the strongest meaning for them. Physical activity as a social experience and catharsis were ranked second and third respectively by the females and third and second respectively by the males. Female athletes scored significantly higher than the male athletes on the social experience and aesthetic dimensions whereas male athletes scores significantly higher than the female athletes on the vertigo dimension. Physical activity as an aesthetic experience had the strongest meaning for the total group of athletes and physical activity as an ascetic experience had the least meaning for the athletes.

Vanek and Hosek (cited in Vanek and Cratty, 1970) studied the motives of 600 athletes in an attempt to identify primary, secondary, and social motives that impinge upon sports performance. In the

centre of the cluster were general motives--need for physical activity and need for achievement. They hypothesized that these two motives were present in varying degrees in all individuals. They further suggested that, although environmental factors play a large part in determining what sport an athlete chooses, the strength of the motive need for physical activity also determines the choice of sport. The other motives identified were: the continuum of submissive-dominance with dominance being closely linked to aggression. Another motive identified on a continuum was the need for variability and novelty of experience versus the need for stability and predictability of the situations in which they find themselves. Vanek and Hosek suggested that team sport athletes usually seek novelty and complexity while individual sport athletes have a greater need for stability and predictability. However, they also noted that in most sports some combination of both novelty and stability are found. Vanek and Hosek also identified social motives that involve interpersonal reactions--empathy, identification, competitiveness, suggestibility, imitation, and projection of feelings of others.

Roudik (cited in Vanek and Cratty, 1970) derived a scheme to explain the motivations of superior athletes. Of the motives identified were mastery over difficult and complex physical situations, aesthetic satisfaction in movement, overcoming of fear of failure, pleasure from competition, pleasure of winning and of demonstrating superior performance in national and world competitions. Roudik noted that an important motive during an athlete's stage of specialization was the selection of a single sport in which to achieve excellence.

Roudik termed the final developmental level of an athlete the stage of superiority. It is during this stage that athletes attempt to maintain and extend their level of dominance in the sport and attempt to achieve success.

Cratty (1973) presented three dimensions along which motives could be studied. Motives could range from unconscious to conscious-- motives for participation unknown to the athlete to very conscious, obvious motives. A second dimension contrasted motives that range from being physiologically determined to those that are psychological and sociological in nature. The third dimension that could influence the reasons athletes participate in particular sports are the athletes' past or recent experiences.

Cratty (1973) also classified motives according to three major sources. He classified motives emanating from sources external to the individual and the sport itself--social rewards such as praise and money. Motives were also classified as emanating from the personal, psychological make-up of the individual and the personal needs of the individual for such things as success, affiliation, and recognition. The third source motives were classified as emanating from was the nature of the sport itself--for example, novelty and complexity of the task.

Cratty (1973) identified several reasons individuals select to participate in sports. Included in these reasons were the achievement of excellence, to achieve mastery of the self and the environment, and the need to belong (i.e., affiliation).

Whittall and Orlick (1979) reported on the development of the

Sport Satisfaction Inventory (SSI) in its preliminary stages. The SSI was designed to ascertain the satisfaction athletes derived from their participation in sport. Since an objective was to develop an instrument which would generalize to many populations, the 400 subjects used thus far have included both male and female athletes (272 males and 128 females), ranging in age from 10-39 years, from 13 different sports, and representing a wide range of ability levels. Various subgroups of the 400 athletes took part in a total of eight studies all of which contributed to the development of the SSI.

The sources of sport satisfaction which emerged from athletes' responses to general, open-ended questions were: 1) Sport/Game, 2) Practice, 3) Coach, 4) Teammates, 5) Opposition, and 6) Personal Ability and Performance. The separation of descriptive item lists (adjectives and/or short phrases) for each source of sport satisfaction from the athletes' responses, subsequent ratings (on a five-point scale) of the lists by athletes as a description of their degree of satisfaction with their participation in sport, and an item analysis on the responses given have resulted in lists of 14 items for each scale.

The mean item intercorrelations for the SSI scales ranged from .24 to .51 with an average item intercorrelation of .34. Using the responses from 85 subjects (43 males and 42 females), the intercorrelations of the scales of the SSI ranged from .01 (opposition/coach) to .58 (coach/practice) with an average intercorrelation of .28. Correlations between each scale of the SSI and the total score ranged from .47 (opposition) to .74 (practice) with an average correlation of .63. Whittall and Orlick (1979) noted that the inter-

correlations of the SSI scales suggest the possibility of a common satisfaction factor as well as distinct areas of sport satisfaction.

Responses from 152 subjects (120 males and 32 females) to the 84-item SSI were used to test for internal consistency. Split-half correlations corrected to full length by the Spearman-Brown formula ranged from .81 to .93 with an average correlation of .85. Stability coefficients of the SSI scales using responses of 33 subjects (23 males and 10 females) after a one-week interval ranged from .42 to .91 with an average correlation of .74.

As the SSI was developed to be able to generalize to many populations a wide variety of athletes were used as subjects (supra, p. 27). However, the increased generalizability may reduce other psychometric properties of the test--for example, validity--for various subject samples. Whittall and Orlick (1979) have indicated that alternate forms of the SSI may be developed for specific populations of athletes.

Whittall and Orlick (1979) have suggested that preliminary data on athletes' incentive systems reported by Alderman and Wood (1976) provide support for the dimensions of sport satisfaction as put forth by Whittall and Orlick. More specifically, they proposed that the scales of the IMI measuring the incentive systems of stress, excellence, and affiliation resembled respectively the sport satisfaction dimensions of Sport/Game, Personal Ability/Performance, and Teammates and/or Opposition. However, my interpretation of the items comprising these specific scales of the SSI leads me to suggest that these scales are not as closely related to the respective scales of the IMI as noted by Whittall and Orlick. Although some of the items for each of these

SSI scales correspond to the items of the respective IMI scales, there are many more items of the SSI scales that do not resemble the descriptions for the IMI scales.

Garvie (1979) carried out a multidimensional study on the motivations of 108 male high school athletes. Each athlete completed a psychological test battery consisting of nine instruments which included a total of 22 scales. The psychological constructs measured varied from basic needs to sport specific orientations: for example, locus of control, intrinsic motivation, self-esteem, and sport incentive motivation (using The Alberta IMI). Also the coaches of the athletes completed a behavioral assessment on the athlete's general sport behavior.

Factor analysis of the athletes' responses to 20 of the 22 scales (independence needs and interaction orientation were removed because of the ipsative nature of the self-actualization test and orientation inventory) resulted in five factors which together were identified as the "focus of motivation in sport" (Garvie, 1979:206). The five factors were interpreted as: affiliation, principle, self versus task, provincial, and respect versus security. Positive loadings on the affiliation factor were: affiliation incentive in sport, relationship needs, and faith in others; whereas the independence incentive in sport had a negative loading on this factor. The hypothesized factor of principle had positive loadings of: self-actualization needs, internal locus of control, attributions to achieve, high self-esteem, intrinsic motivation, and excellence incentive in sport; and negative loadings of the aggression incentive in sport and

relationship needs.

Positive loadings on the self-task factor were self-orientation and the success incentive in sport and the negative loading on this factor was task orientation. Power, stress, success, and aggression incentives in sports had positive loadings on the provincial factor whereas self-actualization needs loaded negatively. The respect-security factor had positive loadings of respect needs and relationship needs and negative loadings of security needs and self-esteem.

Interviews were conducted with the athletes scoring at the upper extreme of each of the five factors and the results supported the psychological test data. Affiliation subjects were in sport primarily for the friendships and being part of the team. Principle factor athletes were focused on excellence and the desire to achieve worthwhile goals. Those athletes who scored high on the self dimension of the self-task factor and the upper level of the provincial factor were similar in motivations. Winning and recognition were major motivations of self-centered athletes while high provincial athletes were high on success and recognition incentives, aggression and power-seeking incentives. The respect-security factor was characterized by athletes who were very concerned about respect and recognition.

Garvie (1979) also reported significant and positive correlations between two aspects of the behavioral assessments completed by the coaches (sport competence score and positive behavior score) and the principle factor.

A variety of approaches and tools to study the motivations of athletes have been reviewed. Multidimensional models have been presented

by researchers in an attempt to identify those variables that influence athletes' motivations to participate in sport. As is evident by the literature reviewed, the reasons athletes participate in sport are extremely variable and difficult to reduce to straightforward guidelines. However, two major reasons that seemed to be repeatedly identified as major sources of athletes' motivations for sport involvement were the excellence/competence dimension and the affiliation/social interaction dimension. Although some of the reasons identified were more positive than others (for example, conflict, aggression, power-seeking, and self-centeredness were identified as more negative dimensions), nevertheless, the fact remains that athletes participate in sport to fulfill these motivations whether they be positive or negative.

Theoretical Framework for Examining the Incentive Motivation of Athletes

The seven incentive systems that were hypothesized to account for motivation in competitive sports were: excellence, power, stress, independence, success, aggression, and affiliation. The motivations of athletes to participate in sport were examined by evaluating the incentive value of goals available to them as defined by these major incentive systems. The construct of incentive motivation in sport defined this approach to the study of the motivations of athletes.

Although it is without question that the actual behaviors of athletes are determined by unique combinations and interactions of

the seven incentive systems, for the purpose of this section of the literature review, it was felt necessary and also appropriate to review each incentive system separately. This approach was the only alternative as the incentive systems have, for the main, been studied in isolation. However, there is no doubt that the carrying out of research on combinations of these incentive systems would be most useful.

In reviewing each incentive system a major emphasis has been on the characteristics and conditions which pertain to the goal activity for each system. That is, previous work that has been done to identify the essence of the general incentives for each system is presented. Also, both general and sport-specific research on the motive underlying the incentives for each system is included. A discussion of each system is concluded by providing the definition for the incentives as they were used in the present study as well as comparing these incentives, where appropriate, to other research that has dealt with the motivations of athletes.

Excellence Incentive System

Research on achievement motivation theory began in the 1940's with the work of McClelland, Atkinson, Clark, and Lowell (McClelland et al., 1953). From this initial work, other major contributions to the theoretical development of achievement motivation followed at periodic intervals (McClelland, 1955, 1961; Atkinson, 1958, 1964; Atkinson and Feather, 1966; and Atkinson and Raynor, 1974, 1978).

The early work on achievement motivation was initially guided by the conceptual analysis of human psychogenic needs which Murray

(1938) had proposed. Also, the technique that Murray (1943) had developed for eliciting imaginative stories (fantasies) from an individual in response to pictures--Thematic Apperception Test (TAT)--was adapted for the study of achievement motivation. The early work was concerned with the effects of individual differences in achievement motivation on behavior. Individual differences in the strength of the achievement motive were inferred from the thematic apperceptive measure of need achievement developed by McClelland et al. (1953).

Achievement motivation is relevant in achievement-oriented situations in which an individual's performance is evaluated either by himself or others against a previously established standard of excellence. Also, the outcome of the performance is evaluated either favorably (i.e., success) or unfavorably (i.e. failure); there is some degree of uncertainty attached to the outcome; and there is some incentive value attached to the outcome (Atkinson, 1964). Thus, competition against a standard of excellence is the focal point of achievement motivation, and it is also the focal point of the excellence incentive system.

In any achievement situation, there are both achievement-oriented motives (motive to achieve success and motive to avoid failure) and situational variables (expectancies and incentives) operating. It is assumed that the motives are relatively stable dispositions which the individual brings with him to each situation whereas the situational variables are specific to the situation and thus vary according to the situation (Atkinson, 1964).

Atkinson (1957) defined the achievement motive or need to achieve

as a "relatively stable disposition to strive for achievement or success" (p. 359). He further characterized the achievement motive as a "capacity for taking pride in accomplishment" (Atkinson, 1964: 241) when success at an activity is achieved. In addition to the positive achievement motive (M_S), it is assumed that in any achievement situation there is also a negative motive to avoid failure (M_{AF}) which Atkinson (1964) characterized as a "capacity for reacting with shame and embarrassment when the outcome of performance is failure" (p. 244).

Expectancy was defined as a "cognitive anticipation, usually aroused by cues in a situation, that performance of some act will be followed by a particular consequence" (Atkinson, 1957:360). The strength of the expectancy was represented by the subjective probability of a particular outcome occurring as a result of given action. The expectancy variables are: 1) P_S --subjective probability or expectancy of success and 2) P_F --subjective probability or expectancy of failure (Atkinson, 1964). Incentive represented the "relative attractiveness of a specific goal that is offered in a situation, or the relative unattractiveness of an event that might occur as a consequence of some act" (Atkinson, 1957:360). The incentive variables are: 1) I_S --attractiveness or incentive value of success and 2) I_F --unattractiveness or incentive values of failure (Atkinson, 1964).

The values for the expectancy and incentive variables in specific situations depend upon the individual's past experiences in similar situations. The model assumed that the value for expectancy of success (P_S) and expectancy of failure (P_F) summed to 1.0. If either success

or failure is the possible outcome when a performance is evaluated against some standard of excellence, the P_f must be weak when P_s is strong and vice-versa. The difficulty of a task as it is perceived by an individual may be expressed in terms of the strength of his expectancy of success (P_s). That is, if an individual perceives a task as being very difficult, the P_s is very low and, conversely, if an individual perceives a task as being very easy, the P_s is very high. Thus, the difficulty of a task as it appears to an individual equals $1 - P_s$ (Atkinson, 1964).

It was assumed that the incentive value of success (I_s) is equal to the apparent difficulty of the task (i.e., $I_s = 1 - P_s$), and the incentive value of failure (I_f) is equal to minus the probability of success ($I_f = -P_s$). Theoretically, if the P_s is very high and thus the task is very easy, then the incentive value of success (I_s) is very low but the negative incentive value of failure is very high. However, where a task is very difficult and thus the P_s is very low, then the I_f is also very low but the I_s is very high (Atkinson, 1964).

The motive to achieve success (M_s) combines multiplicatively with the probability of success (P_s) and the incentive value of success (I_s) to produce what Atkinson (1964) termed the tendency to approach success (T_s). Thus, the strength of motivation to achieve or tendency to approach success was represented as: $T_s = M_s \times P_s \times I_s$. Similarly, the tendency to avoid failure (T_{-f}) was conceptualized as a multiplicative function of the motive to avoid failure (M_{AF}), the probability of failure (P_f) and the incentive value of failure (I_f) (Atkinson, 1964). The resulting equation was represented as $T_{-f} = M_{AF} \times P_f \times I_f$. The

minus sign on the strength of tendency to avoid failure (T_{-f}) implies that the individual is motivated not to perform an act which might result in failure (i.e., he is negatively motivated). Thus, T_{-f} is an inhibitory tendency--a tendency to inhibit performance of actions which are expected to produce failure.

Atkinson's (1964) resultant achievement motivation or the total strength of tendency to approach a specific achievement situation (T_A) was expressed as an algebraic sum of the tendency to approach success (T_s) and the tendency to avoid failure (T_{-f}). As the tendency to avoid failure is always a negative quantity implying avoidance, the resultant tendency to approach success is always weakened by the avoidant tendency that is associated with anxiety over the possibility of failure. Also included in the equation were motivational factors labelled as extrinsic motivation (T_{EXT}) to represent other motives extrinsic to the two achievement motives that may contribute to an individual's tendency to perform a specific activity. The resulting equation was:

$$T_A = T_s + T_{-f} + T_{EXT}.$$

Atkinson (1964) defined extrinsic motivation as the "strength of the tendency to act that is attributable to the influence of other motives and incentives that are not intrinsically related to the evaluation of performance as are the two achievement-related motives" (p. 247). Examples of these extrinsic motives might be need for affiliation, need for stress, need for power, and need for success. The presence of T_{EXT} in the equation emphasized the fact that an individual's behaviors are the interaction of a number of different motives and that no single motive completely explains an individual's

behaviors.

The extrinsic motive most directly related to achievement motivation is what has been identified in the present study under the success incentive system. This motive has often been inextricably linked to achievement motivation. Although success incentives (for example, social approval and recognition for excellence) may often be a natural by-product of excellence incentives, an attempt was made in the present study to differentiate between those individuals motivated by excellence incentives which are the primary focus of achievement motivation, and those individuals motivated by success incentives which have been identified as being linked to achievement motivation. A more complete discussion of the distinctiveness of these two incentive systems is presented under the success incentive system (*infra*, p. 71).

A recent development in the study of achievement motivation theory has been the investigation of the effects of success and failure in an immediate task on an individual's future achievement-oriented behaviors (Atkinson and Raynor, 1974; Raynor, 1978). That is, researchers are now interested in cumulative achievement patterns rather than just the effects of achievement motivation on performance of a single short-term task (an approach which characterized the first twenty-five years of research). The results of this research may provide important information on long-term achievement patterns that characterize real life.

Raynor (1978) defined a contingent path as a series of steps in which immediate success by an individual is necessary for the opportunity to strive for future successes along the path while immediate

failure at a specific step means loss of the opportunity to continue in that path. A noncontingent path was defined as a series of steps in which prior success or failure does not preclude the opportunity for future strivings along that path.

Raynor (1978) hypothesized that "an increase in length of a contingent path [up to a point] should increase an individual's characteristic achievement motivation and therefore increase the difference in motivation between success-oriented and failure-threatened individuals" (p. 81). He proposed that those individuals who are primarily motivated to achieve (i.e., $M_S > M_{AF}$) become increasingly more motivated to do well as the length of a contingent path increases while those individuals who are inhibited from engaging in an activity by threat of failure (i.e., $M_{AF} > M_S$) become more inhibited as the length of a contingent path increases. Birrell (1978) has suggested that this hypothesis, if empirically substantiated, might provide insight into athletes who "cut themselves" from a sport. She also suggested that as an athletic career is an example of a contingent achievement path, it would seem reasonable to expect significantly higher levels of achievement motivation in athletes who have reached elite status.

A second development in achievement motivation theory concerns evidence that provides support for the notion that there is an optimal level of achievement motivation and increases beyond that optimal level have detrimental effects on performance (Atkinson, 1978). Atkinson and Raynor (1978) suggested that the relationship between strength of motivation and efficiency of performance is nonmonotomic and is best

described by an inverted U-function. However, as Atkinson (1978) pointed out, the final curve describing efficiency of performance in relation to strength of motivation depends upon the nature of the task--i.e., what is required of the subject. In Atkinson's words:

The most general statement that can be made about the effect of strength of motivation on efficiency of performance: it depends on the nature and requirements of the task. Persons who are stronger in motivation may perform better, worse, or the same as others on different kinds of tasks. (p. 124)

The striving for successful competition against a standard of excellence implies a need within the individual to excel at and master something--that is, to express competence. This view is consistent with what White (1959) has expressed regarding a competence/effectance theory of motivation. White defined competence in a broad sense to "refer to an organism's capacity to interact effectively with its environment" (p. 297). He proposed that various kinds of behavior (series of learned skills--grasping, visual exploration and walking; acts of focal attention and perception; memory, language, and thinking; exploring of novel places and objects; effecting stimulus changes in the environment; manipulating and exploiting the environment; and achieving higher levels of motor and mental coordination) all of which have to do with effective interaction with the environment should come under the general heading of competence. He further noted that competence motivation satisfied an intrinsic need to deal effectively with the environment.

White (1959) designated the motivation to strive for competence by the motive effectance and specified that this motive was satisfied by feelings of efficacy. He proposed that motives such as cognizance,

mastery, and achievement have a root in effectance motivation.

Weiss (1969) in a philosophical presentation on why man pursues sport suggested that an individual is attracted to participate in sport because it offers a situation where he has the opportunity to demonstrate perfection--i.e., excellence.

Achievement motivation research was based, until recently, on an unitary construct of achievement. Fineman (1977) reviewed the current status of the conceptualization and measurement of the achievement motive construct. He reviewed a description of the construct; the various measures of the motive--project instruments, scales within comprehensive personality inventories, and specific questionnaire measures of achievement; and the psychometric properties of these measures--internal consistency, stability across time, and validity. He reported on 22 instruments that have been devised to measure the achievement motive. The convergent validity of the measures was very poor--72% of the correlations reported showed no significant relationship between pairs of achievement measures. This result reflected the fact that although the measures were designed to tap general achievement strivings their actual content varied enormously indicating the breadth of the achievement motive construct. Several researchers (Helmreich and Spence, 1977; Veroff, McClelland and Ruhland, 1975; and Yamauchi and Doi, 1977) have felt that the achievement motive construct was too broad a construct to be measured as a unitary construct and have attempted to study the multifaceted nature of the achievement motive construct.

As part of a larger study on masculinity and femininity, Helmreich

and Spence (1977) are developing an instrument (Work and Family Orientation Questionnaire) to measure four components of achievement motivation. In an editorial by Horn (1978) on Helmreich and Spence's research on achievement motivation, he made reference to these components of achievement motivation as defined by Helmreich and Spence: 1) Work--"the desire to work hard and to keep busy," 2) Mastery--"a preference for challenging tasks--a drive toward internal standards of excellence," 3) Competitiveness--"concerns the desire to best others--to be successful in interpersonal competition," and 4) Personal Unconcern--"an indifference to the negative reactions of others to one's achievements" (p. 19).

Helmreich and Spence (cited in Horn, 1978) administered this questionnaire to approximately 1300 undergraduates, a national sample of scientists with doctoral degrees, 200 juniors and seniors majoring in varied fields, and men who had graduated from the university's business school. Results were similar for all groups sampled. High scores on work and mastery and low scores on competitiveness were obtained by the most successful men and women. High competitiveness was correlated with success primarily for those subjects who scored low on the other components. Scores on the personal unconcern scale were unrelated to success in all the samples tested. To relate the achievement motivation scores of the samples studied to their success, Helmreich and Spence used objective measures of success: undergraduates--grade point averages, scientists--number of published works listed in Science Citation Index, businessmen--their incomes.

In the sample of 1300 undergraduates, the average male student

scored considerably higher on mastery and competitiveness than the average female student, but the average female student scored considerably higher on work and slightly higher on personal unconcern. However, the female students who had postgraduate and career plans scored as high as the males on mastery but lower in competitiveness (Helmreich and Spence, cited in Horn, 1978).

Helmreich and Spence are now studying varsity athletes which they describe as "perhaps the last hope of demonstrating that a strong need to win over others uniformly contributes to a successful performance" (Horn, 1978:20). They are collecting data on how the performance of athletes correlates with their achievement motivation scores. The athletes have scored higher than any of the other groups tested in competitiveness. However, they speculate, that even in sports, "a strong need to live up to internally imposed standards of excellence, combined with a willingness to work hard and a moderate desire to be better than others, may be the most effective recipe for outstanding performance" (Horn, 1978:20). If this speculation is empirically substantiated, it would appear that among athletes, as among other population groups--students, scientists, businessmen, competitiveness (ie., successful competition against external standards of excellence) may be overrated as a contributor to success. It would appear that work (desire to work hard) and mastery (a drive toward internal standards of excellence) are the more important factors in contributing to success.

Veroff et al. (1975) factor analyzed the responses of a heterogeneous representative urban sample of adults (365 subjects--

approximately equal number of sex and race combination of male and female, black and white) to 17 measures of achievement motivation. Three types of achievement orientation assessment were used: objective questionnaire assessment, projective assessment, and behavioral assessment. Veroff et al. (1975) identified six factors: Factor 1--Assertive Competence Motivation; Factor 2--Task Competence Motivation; Factor 3--Fear of Failure; Factor 4--Social Comparison Motivation; Factor 5--Future Achievement Orientation; and Factor 6--Hope of Success.

Factor 1 (assertive competence motivation) was related to the needs for autonomy and power, and inversely related to affiliation needs. However, a positive interest in competence and a desire to be socially evaluated were also dimensions of this factor. Veroff et al. (1975) suggested that assertive competence motivation appeared to arise from the desire for an individual to see oneself as "successfully performing valued achievement activity in the society" (p. 182).

Factor 2 (task competence motivation) was identified as a "motivation to achieve the demands of a task" (Veroff et al., 1975:182). Veroff et al. suggested that an individual motivated by task competence would choose a task that could be realistically mastered but given any task the individual would try to successfully meet the challenge.

The third factor (fear of failure) was interpreted as a negative motive to avoid challenges and to avoid the possibility of failure (avoidance motivation). The need to compare oneself with others (i.e., need to compete against others) was the essence of factor 4 (social comparison motivation). The fifth factor (future achievement

orientation) was interpreted as representing defensive and unrealistic projections about the future. Veroff et al. (1975) suggested that fear of success is antithetical to a future achievement orientation. The sixth and final factor (hope of success) measured how satisfying meeting standards of excellence (i.e., success) was to the individual. Factors 2 and 6 were the most consistent with the traditional definition of the achievement motive (i.e., need to achieve).

Of the six factors presented, two represented affective orientations to achievement—factors 3 and 6 (fear of failure and hope of success respectively); one reflected a time orientation to achievement (i.e., factor 5—future achievement orientation); and finally three factors reflected different styles of structuring the nature of successful accomplishment (factors 1, 2 and 4—assertive competence motivation, task competence motivation, and social comparison motivation respectively). Veroff et al. (1975) pointed out that these last three factors suggest that individuals use differing standards of excellence—that is, direct evaluations of their competence (assertive competence), objective demands of the task (task competence) or their standing relative to others (social comparison).

Yamauchi and Doi (1977) administered 11 measures of achievement motivation (TAT measures and objective questionnaires) to 77 male university students. Four factors resulted from a principal components analysis and a normalized varimax rotation of these responses leading support to the notion that achievement motivation is not a unitary construct. Factor I was interpreted as the positive versus negative direction of the achievement-oriented tendency of the motive

to avoid failure (M_{af}). Factor II was identified as the positive direction of the achievement-oriented tendency of the motive to achieve (M_s) as measured by objective questionnaires. Factor III was defined as the personality component of the resultant achievement-oriented tendency ($M_s - M_{af}$). Thus, this factor represented the bipolar factor for M_s and M_{af} . Factor IV represented the motive to achieve (M_s) as measured by two paired-items questionnaires.

Yamauchi and Doi (1977) isolated three psychological dimensions of achievement motivation: motive to achieve (M_s)--factors II and IV, motive to avoid failure (M_{af})--factor I, and the personality component of the resultant achievement motivation ($M_s - M_{af}$)--factor III. However, the factors identified appeared to be an artifact of the method of assessment and not the construct being measured. Factors I, II, and IV consisted of responses from objective questionnaires whereas factor III had loadings from TAT measures and questionnaires. Yamauchi and Doi also suggested that the motives to achieve (M_s) as identified by factors II and IV were not related to the motive to avoid failure (M_{af}) and thus would include the same motivational components whereas the motive to achieve (M_s) in factor III had a different motivational component from those in factors II and IV as this M_s and the M_{af} occupied the positive and negative dimensions respectively of factor III.

Birch and Veroff (1966) described the achievement incentive system as:

. . . an incentive system defined by goal-activity centering on successful competition with standards of excellence applied to an organism's performance. If an individual does

better than he did the last time, or some other person, or some external standard, then he is said to have successfully competed with a standard of excellence. (p. 56)

The exact nature of the standards of excellence which an individual is competing against is determined by the type of goals an individual is pursuing. Goals can be internal or external and relative or absolute. An internal and relative standard of excellence involves the judging of an individual's performance by his own capabilities. Thus, an individual is competing against the performance level he has set. Internal and relative standards are most easily applied when an individual knows what his capabilities are and what performance is required. Absolute and external standards of excellence are used when an individual's capabilities are unknown. External and absolute standards infer comparisons with other athletes or some externally set goal. In ambiguous achievement settings, external and absolute standards are most easily applied. It is important to realize that although an individual may be successful by some externally set standard, he may still face failure as he has a higher internal standard of excellence than was externally set for him (Birch and Veroff, 1966).

The use of internal and relative standards of excellence would seem to be most relevant for athletes to develop positive orientations toward achievement and to develop realistic and/or honest appraisals of their capabilities. In this way, success is defined in terms controllable by the athlete. Thus, if an athlete jumps higher or runs faster than ever before, and if his past history indicates that such a performance is indeed a new high, then this performance should most appropriately be defined as a success and not as a failure just

because another athlete has performed better. Unfortunately, many coaches teach athletes to define success in less appropriate and more dangerous terms such as winning.

Although achievement motivation has been studied using a variety of approaches and the achievement motive has been studied as both a unitary and multidimensional construct, the component of achievement identified as excellence/competence has always risen to the top as being the key dimension to achievement. Thus, from this literature review on the excellence incentive system, excellence incentives in sport were characterized by the opportunities for athletes to do something extremely well or to be very good at something--that is, to successfully compete against a standard of excellence (Alderman and Wood, 1976). This excellence incentive system has some similarities to what Watson (1976) identified as achievement mastery as one of the components of game attraction for young athletes, to what Butt (1979) identified as competence as one of the psychological motivation components in her model of sport motivation, and to what Garvie (1979) labelled as a principle factor as one of the five factors identified to explain the focus of motivation of male high school athletes. This system also has some similarities to what Berlin (1974, 1979) has interpreted as the motive-incentive system of mastery, and to what Berlin (1974) had originally labelled as a maneuvering for accomplishment factor both of which she had presented as part of her model to explain the motivations of collegiate women athletes.

Power Incentive System

Winter (1973) observed that the role of power in human affairs has been written about at least since Plato described the decline of the ideal state and the rise of the despot. He further noted that subsequent writers such as Machiavelli, Hobbes, Nietzsche, and Adler concluded that man's nature and the origins of human society could be explained by the striving for power.

In an English translation of a paper originally written by Adler after World War I (Adler, 1966), the editors commented that Adler's paper showed that he "considered the striving for personal power not a 'primary process' of human nature but as derived from a false guiding ideal, a personal value, which he believed could and must be replaced by a better ideal, that of social interest" (p. 166). In Adler's (1966) view:

The Individual Psychologist can maintain with certainty that general and personal suffering are always connected with the fact that today we have constructed our guiding ideal still too little in accordance with social interest and too much in accordance with personal power. (p. 168)

Adler obviously recognized the role that striving for power occupies in human society and maintained that it was detrimental to the survival of human society. He went on to say that "the striving for personal power is a disastrous delusion and poisons man's living together. Whoever desires the human community must renounce the striving for power over others" (Adler, 1966:169). Notwithstanding Adler's viewpoint, power is seen today as a viable incentive system operating in the whole of the human environment and specifically, for the purpose of this study, within the context of competitive sport.

McClelland (1970, 1975) remarked that in American society it is positively reinforcing to have a high need to do things well (achievement) or to make friends (affiliation) but it is reprehensible to express a concern about having a need to influence others (i.e., power). McClelland (1970) argued that power has two faces--personal and socialized. The personal or negative face of power was characterized by an active seeking to win out over opponents; that is, life is a zero-sum game (if I win, you lose). He concluded that this face of power is primitive in that the strategies employed are adopted early in life before an individual has been sufficiently socialized to learn the more subtle techniques of influence. Personal power was expressed in fantasy, in thoughts of conquering opponents, and in real life it led to simple direct means of feeling powerful--drinking heavily, being aggressive, acquiring prestigious possessions.

The socialized or positive face of power was characterized by a concern for group goals, helping a group formulate goals, and helping members of the group with ways to achieve these goals. In fantasy, it was expressed as a concern with exercising influence for the benefit of others; and in real life, it led to interests in politics, holding office, and informal sports. Socialized power was considered to lead to effective leadership because an individual whose motivation for power is at this level treats other members of the group like origins and not pawns.

McClelland (1975), in his research on power motivation, classified power orientations of individuals into four stages. Individuals at stage I were characterized by an orientation towards power from



the outside, feelings of dependency and drawing strength from others. Power-oriented reading (i.e., McClelland suggested Playboy and Sports Illustrated) was considered to be characteristic of individuals at this stage. A desire for autonomy and self-reliance and an accumulation of prestigious possessions characterized individuals at stage II. Individuals expressing a desire for controlling others and competitiveness were characterized as being at stage III. Individuals who are at stage III were considered to be drawn to specific competitive sports--those sports in which competition is against another opponent (e.g., basketball) rather than nature or the clock (e.g., swimming) (Winter, 1973). In the fourth and final stage, the individual perceived himself as an instrument of higher authority which influences him to serve others (altruism).

It is important to note that McClelland's (1975) data did not always support the identifying characteristics he proposed for the four stages of power motivation. However, some suggestions from aspects of this research are relevant to sport. The distinction suggested in stage III between those sports that provide an area for the power motive and those which do not indicates that differentiated motivation may exist for different categories of sport. McClelland (1975) also suggested that high need for power in both sexes is associated with stage III. Also, "n Affiliation [need for affiliation] is more positively associated with stages I and II; and if anything it is negatively correlated with stage III" (McClelland, 1975:275).

Need for power (n Power) as operationally defined and measured

by a Thematic Apperception Test (TAT) reflects the power motive. The development of a scoring system by Veroff (1957, 1958) for a TAT-oriented power motive paralleled those developed to measure the achievement (McClelland et al., 1953) and affiliation (Atkinson, Heyns, and Veroff, 1958) motives. Veroff (1957) defined the power motive as "that disposition directing behavior toward satisfactions contingent upon the control of the means of influencing another person(s)" (p. 1). Veroff and Veroff (1971) stated "that the goal of power, the power incentive, is reinstatement of freedom from constraint in the decision process. Successful power can be defined in terms of a person's own standard of control in the decision process" (p. 64).

Veroff and Veroff (1971) listed a series of conclusions based on results accumulated on power motivation as measured by TAT. Their two most relevant conclusions were:

- 1) High power motivation can underlie apparently successful life styles if affiliation motivation is low, but such a life style with a single-theme motivational base can be fraught with conflict. (p. 67)
- 2) High power motivation in combination with other strong motives (affiliation and achievement) can contribute to a differentiated and zestful life. (p. 68)

Veroff and Veroff (1972) reiterated these two conclusions in their review of research that used a TAT measure of power motivation. Thus, a narrow life style will likely emerge for a person who develops power motivation in the absence of affiliation, and this would likely cause conflicts in many social roles that demand affiliation. However, with differentiated experiences, heterogeneity of motives are

engendered instead of intense single motives. The lack of intense single motives likely results in more appropriate behaviors in most situations.

In their review of research using a TAT measure of power motivation, Veroff and Veroff (1972) specified that the TAT measure of power motivation as originally developed by Veroff (1957, 1958) was designed to measure the "desire for power in terms of influence and control" (Veroff and Veroff, 1972:279). They suggested that this measure of power motivation largely reflects a generalized concern about negative power goals which they labelled fear of weakness. They further emphasized this position with the following:

Many different pieces of evidence support the view that the power incentive defined as "control of influence of others" should not be generally conceived as a positive goal in which there is active joy from having impact per se but primarily as a negative goal in which there is, as Adler suggested, an avoidance of feelings of powerlessness as men strive for perfection. (Veroff and Veroff, 1972:280)

Demographic distributions of this measure and its associations with feelings of adjustment in specific and general life roles supported this assertion. This fear of weakness appeared to lead to situations of either avoidant power behaviors or cost in personal adjustments, and in some situations, when the power demands were not publicly salient, to a positive adjustment.

Veroff's (1957, 1958) system for scoring n Power measured some combination of both positive and negative aspects (approach and avoidance behaviors) of the power motive (although primarily negative aspects as noted by Veroff and Veroff, 1972). Winter (1973) stated that Veroff's definition of power in terms of "control of the



means of influence" (p. 57) was difficult to apply directly to many stories where power in the sense of having impact was involved, but the "means of influence" (p. 57) was remote and abstract. Winter also concluded that fifteen years of research using Veroff's power motive have produced conflicting results--the construct reflected power-seeking behavior in some situations while at other times behavior reflected the avoiding of power. For these two reasons, both Winter (1973) and Uleman (1972) made separate attempts to revise the Veroff scoring system.

Uleman (1972) subsequently called his measure *n* Influence--the actual face-to-face influence of another person for its own sake. He explicitly differentiated *n* Influence from the Veroff measure of *n* Power. Uleman (1972) noted that *n* Influence involves exercising influence from a previously established power base whereas *n* Power involves gaining that power base. A second difference between *n* Power and *n* Influence noted by Uleman was that *n* Influence persuades others through interaction and continuous give-and-take whereas *n* Power is more one-way in which control is attained and imposed on others. Also, Uleman's subcategories of *n* Influence seem to be more positive or approach oriented than those of Veroff's. Uleman contended that *n* Influence results from the confidence an individual has in one's ability to exercise influence and a desire to exercise that influence while *n* Power results more from a lack of confidence and a desire to compensate for that weakness by gaining power.

Winter (1973) saw the power motive as a key personal variable that is important for understanding power behavior. By power motive

he meant a disposition to strive for certain kinds of goals or to be affected by certain kinds of incentives--power is the goal. Winter defined social power as "the ability or capacity of O to produce (consciously or unconsciously) intended effects on the behavior or emotion of another person P" (Winter, 1973:5). Winter integrated several scoring systems for n Power (including Veroff, 1957; Uleman, 1972) into one revised system in which the total n Power score represented the sum of both approach and avoidance aspects of the power motive. He reported on research using three power motive scores: overall n Power, hope of power--measure of the approach motive, and fear of power--measure of the avoidance motive. Veroff and Veroff (1972) added support to Winter's revised scoring system when they expressed a concern about the unidimensionality of the TAT measure of the power motive as originally developed by Veroff (1957, 1958) and suggested there ought to be not one but perhaps several measures of power.

One study of particular relevance carried out by Winter (1973) investigated male undergraduate athletes and non-athletes. In contrast to the non-athletic sample, those individuals who had won varsity letters in directly competitive sports (e.g., basketball, baseball, tennis, squash) were higher in n Power, while those in nondirectly competitive sports (e.g., swimming, track, golf) were not. Thus, need for power seemed to be associated with participation in specific competitive sports. It appeared to be more closely associated with those sports where the player tries to dominate an opponent whereas it was less closely associated with those sports

where competition is to a large extent with nature or the clock rather than with another athlete. However, contrary to Winter's findings, Nell and Strümpfer (1978) reported no significant differences in mean n Power scores of male undergraduate students as a function of type of sport participated in, number of sports played, or frequency of playing.

Birch and Veroff (1966) characterized the power incentive as the "condition of obtaining the means of influencing another person's decision" (p. 76). This included not only direct attempts at having power over another person but also indirect attempts. Thus, the power incentive was not necessarily proportional to powerful behavior. The term "influencing another person's decision" was further clarified as social influences that direct another person to change his attitude about an object, person, or event.

The power incentive may be more attractive when there is more change necessary for influence to occur (as in circumstances where there is the most resistance to influence from other people). Thus, in the power incentive there exists an interaction of at least two people's potential influence on each other. Also,

A person's influence over another is not only his ability to change another person but also his ability to withstand another person's influence. The power incentive not only should include the control of means of influencing another but also the control of the means of not being influenced by another. (Birch and Veroff, 1966:77).

Power incentives may often lie behind behaviors of influence where the influence can be considered as a skillful accomplishment. In this way, the power incentive system can be seen to be interrelated with the excellence incentive system.

Emanating from this literature review on the power incentive system, power incentives in sport were characterized by the opportunities for athletes to influence, change, and control the opinions and attitudes other people (primarily other athletes and coaches) have toward them (Alderman and Wood, 1976). The power incentives in sport also included resisting being controlled by other athletes and coaches. Power incentives in sport were one component of the factor labelled provincial in Garvie's (1979) study.

Stress Incentive System

Evidence to support the view that organisms seek stimulation was identified independently from a variety of research traditions (Donnelly, 1978 and Ellis, 1973 provided reviews of these research traditions). Ellis grouped the areas of research into three major categories--human vigilance (e.g., Mackworth, 1970), sensory deprivation (e.g., Jones, 1969) and manipulative-exploratory behavior of primates (e.g., Berlyne, 1960). Donnelly identified four major sources that led to the identification of the need for stimulation--sensory deprivation, perceptual style (e.g., Sales, 1971), Pavlov's typology (e.g., Gray, 1964) and trait approach (e.g., Zuckerman, Kolin, Price, and Zoob, 1964).

Researchers in each of these areas identified need for stimulation by a variety of different labels: stimulus-seeking, sensation-seeking, arousal-seeking, eustress-seeking, need for change, perceptual reduction and augmentation, strength of the nervous system,

and stimulus addiction (Donnelly, 1978). The results from these diverse research areas can be summarized by the following premise: individuals have a need for an optimal level of stimulation and behave to attain and maintain this optimal level.

Berlyne (1960, 1978) identified two types of exploratory behavior--diversive and specific. He defined specific exploration as exploration aimed at stimuli focusing on one particular event and being directed toward a stimulation to reduce subjective uncertainty. Diverisive exploration was identified as being unfocused and thus having no such direction. Berlyne (1978) referred to curiosity as being pertinent to specific exploration and not diverisive exploration. However, he further stated that it was difficult to distinguish between specific and diverisive exploration as exploratory responses in humans often involve both types.

The likelihood, vigor, and direction of exploratory behavior depend on such properties of stimulus patterns as novelty, complexity, uncertainty, and conflict (Berlyne, 1960, 1978). Berlyne (1960) collectively referred to these stimulus properties as collative variables as they depend on collation of information from different sources and on comparison of stimulus events and on detection of similarities and dissimilarities.

Novelty was the first stimulus property to be related to exploration. Berlyne (1960, 1978) identified many distinct ways in which something could be novel. A stimulus could be novel with respect to an individual's total experience or novel with respect to his recent experience. An event could be completely novel in that it

has never been experienced before, or it could be novel in the sense that it has not occurred in the last few minutes (short-term novelty) or last few days (long-term novelty). The terms absolute and relative were also used to distinguish novelty. A stimulus could be absolutely novel in that the qualities of that stimulus have never been perceived before or it could possess relative novelty in that the stimulus pattern would possess both familiar and unfamiliar attributes. Berlyne (1960) proposed that a stimulus possessing an intermediate degree of novelty (a stimulus that is like something well-known but distinct enough to be interesting) has the most effect in influencing stimulus selection. He suggested that an individual is too indifferent to things that are either too familiar or too remote to one's experiences.

Berlyne (1960) suggested that a novel stimulus pattern usually generates uncertainty. He also noted that uncertainty increases with the greater the range of alternatives for an outcome. He further noted that the maximum of uncertainty is reached when an event has an equal chance of materializing or not materializing. Uncertainty is obviously resolved by the outcome. Berlyne (1960) also stated that the amount of conflict stimulus situations possess is a function of the number of competing response tendencies, the absolute strength of these response tendencies, and the nearness to equality in strength of these response tendencies.

Berlyne (1960) emphatically declared that complexity is the most impalpable of these stimulus properties. He referred to it as the amount of variety or diversity in a stimulus pattern. He further stated that complexity increases by increasing the number of

distinguishable elements and the dissimilarity between the elements, and by manipulating the elements so that they cannot be responded to as a simple unit.

Fiske and Maddi (1961) suggested that there is a characteristic level of activation at each stage of an individual's sleep-wakefulness cycle. They used the term impact to describe that property of a stimulus which determines activation level. Variation, intensity, and meaningfulness of the stimulus were the sources of impact identified by Fiske and Maddi. Variation in stimulation from exteroceptive, interoceptive, and cortical sources were all important in contributing to a change in activation level. They further postulated that an individual acts to maintain his activation level at his characteristic or normal level, and thus behaves to modify impact in the direction which reduces any discrepancy between actual and characteristic levels of activation. This characteristic level of activation which identifies the various stages of an individual's sleep-wakefulness cycle defines what other researchers have identified as optimal level of stimulation.

Sales (1971) proposed a theory to account for individual differences in stimulus-seeking tendencies (i.e., need for stimulation).

The three assumptions of this theory were:

1. Exposure to a specific stimulus does not affect all individuals in the same way. For some individuals, the stimulus appears to become smaller, lighter, quieter, and less intense over time. For others, this same stimulus appears to become larger, heavier, louder, and more intense over time.
2. Individuals desire to maintain an "optimum" level of internal, received stimulation. If this current level of objective stimulation evokes an internal response which is

either "too small" or "too large," they will attempt to change their input and will react negatively to the current input. If their current level of objective stimulation evokes an internal response which is "just right," they will attempt to maintain this input and will react positively to it.

3. The optimum level of internal, evoked stimulation tends to be similar for all individuals. (p. 125)

Sales (1971) provided support for the first two assumptions but the third one was unsubstantiated and was in contrast to those (e.g., Berlyne, 1960; Fiske and Maddi, 1961; and Zuckerman et al., 1964) who suggested that the optimal level of stimulation is different for all individuals. The use of a measuring device from perceptual research--the kinesthetic after-effects task which compares an individual's original judgements of the size of a stimulus with his judgement of this same stimulus following continuing stimulation of the modality--supported assumption number one. Assumption number two has been espoused by other theorists such as Berlyne (1960) and Fiske and Maddi (1961). Sales suggested that perceptual reduction and augmentation research may best explain the third assumption. A reducer tends to seek more objective stimulation in order to attain his desired subjective optimum whereas an augmentser needs less stimulation as he requires little input to attain the same subjective optimum. Sales proposed that an "average" stimulus-environment is just right for the moderate but would be too high for the augmentser or too low for the reducer.

Sales (1971) reported on four experiments which investigated various dimensions of this theory. The general hypothesis that encompassed these four studies was that individuals who have a high need for stimulation (i.e., reducers) tend to seek out and respond

favorably to novel, complex, and interesting stimulus situations whereas individuals who have a low need for stimulation (i.e., augmenters) tend to seek out and respond favorably to quiet, peaceful, and simple stimulus situations. The studies indicated that individuals high in measured need for stimulation reacted favorably to interesting stimuli, exhibited high levels of activity in a deprived stimulus situation, showed high levels of talking in a group discussion, and attended closely to complex verbal communications. The data reported from these studies were consistent with Sales' theory.

Zuckerman (1978) espoused that sensation-seeking (demand for stimulation and varied experience) is a general trait that is not restricted to any one sensory modality. For example, individuals who desire more visual stimulation than others also want more stimulation from other senses. To quantify the construct of optimal stimulation level, Zuckerman developed the Sensation-Seeking Scale (Zuckerman, 1978; Zuckerman et al., 1964; Zuckerman and Link, 1968). Although the scale consisting of forced-choice items has gone through many versions, it originally was developed from sensory deprivation research on the basis that differences in individuals' optimal levels of stimulation would account for individual differences in reactions to sensory deprivation. Later versions of the scale went beyond the sensory deprivation model and investigated experiences sensation-seekers were having in the real world (Zuckerman, 1978).

Analyzing the pattern of responses to the items and the clusters the items fell into, Zuckerman (1978) identified four primary expressions of sensation-seeking: 1) Thrill and Adventure-Seeking--desire

to seek excitement in risky but socially acceptable activities (e.g., parachute-jumping); 2) Experience-Seeking--desire to seek sensation through the mind and the senses and through a nonconforming lifestyle; 3) Disinhibition--an escape for individuals who choose the middle-class life and find it tedious can be found in such activities as social drinking, partying, and gambling; and 4) Boredom Susceptibility--a low tolerance for a repetitive and constant experience. Zuckerman emphasized that individuals who score high on one of these four factors are likely to score high on the others as well. This he maintained supported his belief that sensation-seeking is a broad, unitary trait rather than a trait that reflects learned preferences for specific types of activity.

Ellis (1973) proposed stimulus-seeking behavior as an explanation for play behavior. Stimulus-seeking behavior serves the need for optimal arousal. Play as arousal-seeking is caused "by the need to generate interactions with the environment or self that elevate arousal (level of interest or stimulation) towards the optimal for the individual" (Ellis, 1973:111). This explanation assumed that "there is a need for optimal arousal" and "change in arousal towards optimal is pleasant" (Ellis, 1973:111).

Sports provide for both many different forms of stimulation and a wide range in the degree of stimulation. Berger (1972) and Donnelly (1975, 1976) carried out studies that included a number of different sports.

Berger (1972) hypothesized that athletes participating in uncertain sports and high harm sports tend to be reducers while

athletes participating in certain sports and low harm sports tend to be augmenters. She used Vando's (1969) Reducing-Augmenting Scale to determine differences in need for stimulation; and she classified sport environments as to their degree of temporal/spatial uncertainty, the probability of physical harm, and the nature of competition. Her results lent some support for her hypotheses. Athletes who participated in the uncertain sports of wrestling and skiing had a significantly higher need for stimulation than hurdlers. (She had classified hurdling as representing a middle level of uncertainty.) Only in extreme cases with skiers and wrestlers having the highest need for stimulation and tennis players the lowest was the expected relationship between probability of physical harm and perceptual reduction supported.

Although hurdling was considered to have a higher probability of physical harm than swimming, hurdlers were found to be augmenters whereas swimmers were found to be reducers. To account for this result, Berger (1972) suggested that the type of pain endured by swimmers in training and competition may be greater than that required of hurdlers. Berger also rank-ordered her sport groups with respect to their mean scores on the Reducing-Augmenting Scale. The rank-order (from high to low) was as follows: 1) Divers, 2) Skiers, 3) Wrestlers, 4) Gymnasts, 5) Swimmers, 6) Throwers (Field events), 7) Golfers, 8) Tennis players, and 9) Hurdlers.

Donnelly (1975, 1976, 1978) investigated the relationship between sport participation and need for stimulation. He believed that individuals express their need for stimulation by voluntarily choosing to

participate in sports which best meet that need. He specifically hypothesized that:

1) Expressed need for stimulation is directly related to expressed preference for selected stimulus dimensions of sport environments; and 2) expressed need for stimulation will be greater for individuals expressing a preference for forms of sport involvement characterized by environmental uncertainty than for individuals choosing more certain sport environments. (Donnelly, 1978:33)

The subjects were 309 undergraduates (135 males and 174 females) enrolled in physical education skill courses. They rated 28 sport environmental dimensions where such items as fast-slow, vertigo-no vertigo, and high-low risk were set at opposite ends of a five-point scale. They also completed Vando's (1969) Reducing-Augmenting Scale. Significant correlations between need for stimulation and 14 of the sport environmental dimensions for males and 23 of the dimensions for females provided support for hypothesis number 1. The highest correlations were reported for those dimensions which assessed the most stimulating aspects of sport (e.g., risk, vertigo).

To test the second hypothesis, Donnelly (1978) classified sports as certain, uncertain, or mixed as a function of their degree of environmental uncertainty. He considered uncertainty in terms of whether the participant was in control of the activity to the extent that he knows what is going to happen next or whether the events of an activity were primarily unpredictable or uncertain. He assumed uncertain sports produced higher levels of stimulation than certain sports if factors such as level of competition were similar. For both males and females, the uncertain groups had the highest mean need for stimulation, and these mean scores were significantly different

from the certain and mixed groups.

Donnelly (1978) also rank-ordered his sport groups with respect to their mean scores on the Reducing-Augmenting Scale. The rank-order (from high to low) was as follows: A) for males: 1) Fencing, 2) Scuba Diving, 3) Archery, 4) Mountaineering, 5) Karate, 6) Orienteering, 7) Tennis and Badminton, 8) Swimming, and 9) Bowling. B) for females: 1) Scuba Diving, 2) Mountaineering, 3) Fencing, 4) Swimming, 5) Tennis and Badminton, 6) Archery, 7) Bowling, 8) Self-Defence, and 9) Orienteering. Donnelly stated that the groups generally fell into a ranking of certain and uncertain sports although there were several unpredicted results (e.g., high ranking of archery for males).

From his results, it appeared that individuals select sports which satisfy their need for stimulation. Thus, need for stimulation may be an important motivating factor related to sport participation.

The merging of Birch and Veroff's (1966) sensory and curiosity incentive systems into one system provided a direct relationship to the literature discussed on stimulus-seeking. The sensory incentives depended on the stimulation of sensory experiences--seeing, hearing, feeling, tasting, and smelling. Perceiving changes in curiosity characterized the goal activity of the curiosity incentive system. All that was required for the curiosity incentive to occur was recognition by the individual of a change in the pattern of stimulation. Birch and Veroff related the two systems by asserting that perceptual responses that integrate sensory experiences are necessary for the enacting of the curiosity incentive. They are consistent with the

main premise of stimulus-seeking behavior (supra, p. 57) in that they further stated that individual differences exist in the need to experience sensory stimulation and that there is some optimal stimulus change that an individual orients himself to within the curiosity incentives.

Emanating from this literature review on the stress incentive system, stress incentives in sport were characterized by the opportunities for athletes to have exciting, interesting, and sensory experiences primarily in terms of novelty, uncertainty, and complexity (Alderman and Wood, 1976). The stress incentive system has some similarities to what Watson (1976) identified as intrinsic motivation as one of the components of game attraction for young athletes. Stress incentives in sport were one component of the factor labelled provincial in Garvie's (1979) study. The stress incentive system is also related to the subdomain of physical activity as the pursuit of vertigo which Kenyon (1968a) had postulated as one of the six subdomains to characterize physical activity as a socio-psychological phenomenon.

Independence Incentive System

The literature on independence motivation is quite limited. This sparseness was reflected in the lack of systematic studies that would lead toward the development of a theoretical framework for the study of independence motivation. A review follows of the available, most pertinent studies on the independence construct.

Heathers (1955), in investigating the development of dependence-

independence in preschool children, identified two forms of independence--instrumental and emotional. "Instrumental independence means conducting activities and coping with problems without seeking help" (Heathers, 1955:278). He noted that a measure of instrumental independence may be determined by the extent to which a child persists in a task without seeking help. It was also noted that the development of frustration tolerance is a dimension of acquiring instrumental independence. He further noted that persistence until a child reaches his goal is the critical factor in learning to effectively deal with frustration.

Heathers (1955) specified five factors that influence a child's level of instrumental independence:

1. The more frustration a child encounters while performing an activity, the more will he tend to seek help.
2. The more a child expects that help is available, the more will he tend to seek it.
3. The more a child expects he can reach his goal unaided, the less will he tend to seek help.
4. The more reassurance a child receives while performing an activity, the less he is apt to seek help.
5. The more a child expects approval for reaching a goal unaided, the less will he tend to seek help. (pp. 285-286)

Heathers (1955) defined emotional independence as the absence of needs for reassurance, affection or approval in specific situations. This aspect of emotional independence he identified as emotional self-reliance. A child is emotionally self-reliant (self-confident) when he faces threats of rejection or injury without requiring emotional support. Acquiring self-reliance in physical threat situations depends on dealing with the situations successfully and developing expectations

of being successful on one's own. Acquiring the capacity to tolerate rejection by others is one form of emotional self-reliance. This tolerance can be acquired either by having alternative ways of satisfying one's needs for affection and approval when rejection occurs or by learning to discriminate the people who satisfy these needs from those who don't. An individual can handle rejection by those who "don't matter" as long as those whom he counts on are not also rejecting (Heathers, 1955).

As a second dimension of emotional independence, Heathers (1955) included self-assertion in the form of needs to master tasks and to dominate others. Self-assertion assumes specific independence needs while emotional self-reliance does not. The need to master a task is the need for self-approval of one's performance, and the need to dominate others is the need for self-approval of one's assertive behavior. In acquiring self-assertion, others' approval are internalized (i.e., "adopting others' standards as to the sort of performance required to gain approval, and feeling self-approval when these standards are satisfied," Heathers, 1955:289); and thus, self-approval becomes the basis for satisfaction of self-assertion needs. The relevant goals in satisfying self-assertion needs are feelings of adequacy or superiority (Heathers, 1955).

Heathers (1955) asserted that an individual becomes independent of others to the extent that he can satisfy his needs without requiring others to respond to him in particular ways. He linked dependence and independence by the need for approval which is a dependence need as well as a basis for learning both emotional and instrumental

independence.

Kasl, Sampson, and French, Jr. (1964) reported on the development of a projective measure of the need for independence in a study of female undergraduates on conformity and resistance to influence attempts. For the need for independence, an individual perceives himself as the main source determining his behavior and having a maximal amount of freedom from the control of others. The major hypothesis of the study was: " . . . whenever the influence attempt of another person O arouses the need for independence in P, the stronger P's need, the greater will be P's resistance to O's influence attempts" (Kasl et al., 1964:579). The major finding was that approach need for independence was negatively correlated ($r = -.44$, $n = 42$, $p < .001$) with amount of conformity on an ego-involving task (attitudes task). This finding supported the hypothesis of the study. Although Kasl et al. (1964) reported on the development of a measure of the need for independence, it appears that their construct of independence resembles very closely the concept of power as defined by Veroff, 1957 (supra, p. 51). They in fact pointed out that their objective was to develop an instrument which would predict reactions to social influence and power. They further expressed that they felt that Veroff (1957) saw the need for independence as part of his power concept.

Birch and Veroff (1966) discussed the independence incentive system by comparing it with three of their other systems--achievement, power, and affiliation. They defined independence as accomplishing an activity without help. They further stated that independence

activity can be related to achievement, power, or affiliation goals.

Birch and Veroff (1966) expressed that independent accomplishment was not necessary in defining their achievement incentive system but the two incentives could overlap. They differentiated the independence incentive system from the power incentive system by contending that "under the power incentive system a person is resisting someone having control over a decision, while in the independence incentive, a person is resisting another person assisting in any given process" (Birch and Veroff, 1966:81). They also expressed that an emotional investment in independence often designates a negative affiliation incentive (counter-dependent). With counter-dependency, an individual is interested in independence as a means of preventing affiliative dependence.

Situations arise when social incentive systems become dominant over the independence incentive system (Birch and Veroff, 1966). Such a situation occurs when social evaluation for an independent task becomes necessary. Another illustrative example is a situation where achievement incentives become more dominant as an individual persists independently at an activity and does not accomplish the task.

Different types of skill are necessary to become independent in different settings (Birch and Veroff, 1966). They proposed that those who achieve independence most easily are those who are competent. However, an individual may have to forgo achievement in certain tasks if he chooses to remain independent. Confidence in personal effectiveness can be a psychologically available response that is essential if an individual is to select independent courses

of action over non-independent ones.

From this brief literature review on the independence incentive system, independence incentives in sport were characterized by the opportunities for athletes to do things on their own without the advice or criticism of any other person (primarily other athletes and coaches) (Alderman and Wood, 1976).

Success Incentive System

In the excellence incentive system (supra, p. 40), research was reviewed that attempted to breakdown the unitary, broad construct of achievement motivation into more specific constructs (Helmreich and Spence, 1977; Helmreich and Spence cited in Horn, 1978; Veroff et al., 1975; Yamauchi and Doi, 1977). Even Atkinson (1964) had acknowledged the contribution of extrinsic motivation in influencing an individual's resultant achievement motivation although he didn't specify the nature of these extrinsic factors (supra, p. 36). It was hypothesized in the present study that an extrinsic factor very directly related to achievement motivation is the success incentive system.

Costello (1967) reported on three studies that were carried out to develop a self-report measure of achievement motivation. Study 1 reported on a factor analysis of responses, by 191 males and 191 females aged 17-59 years and from a variety of occupations (e.g., college students, nurses, firemen, psychiatrists), to 100 yes-no items designed to measure achievement motivation. Two main factors emerged which accounted for 24% of the total variance while none of the other factors extracted accounted for more than 2% of the total variance. Items with the largest variance attributable to factor 1

and the smallest variance attributable to factor 2 were selected and vice-versa. This resulted in 14 items for factor 1 and 20 items for factor 2. With the second study, the same two factors emerged from a factor analysis of responses by 100 male and 100 female college students to the 34 items. The final factor 1 (Scale 1) had 10 items and the final factor 2 (Scale 2) had 14 items. Prior to administration of the inventory, items of both scales were reworded so that half of the items in each scale were keyed in the "yes" direction and half in the "no" direction. The content of the items led Costello to interpret factor 1 as measuring the dispositions of an individual who wants to do a job well and factor 2 as measuring the disposition of an individual who desires to be a success. In a third study of 132 female and 132 male college students, Costello reported split-half reliabilities of .82 and .73 for scales 1 and 2 respectively, and an intercorrelation of $-.17$ between the two scales.

In summary, Costello (1967) devised two scales that were considered to measure two distinct components of achievement motivation: Scale 1--need to do a job well when performing a task; and Scale 2--need to be a success. Scale 1 falls under the excellence incentive system of this study whereas Scale 2 appropriately fits into the success incentive system.

Burton (1971) used Costello's (1967) scales in a study of college women who were introduced to the sports of riflery and bowling. She found no relationship between the achievement motive scale designated as the need to do a job well (i.e., the need to achieve through one's own efforts) and the scale designated as the need to be a success

(which emphasizes emulating the successful rather than achieving via hard work). There was no relationship between skill attainment in riflery and the two motivational dispositions, and between skill attainment in bowling and the need to be a success but there was a significant negative relationship between the need to do a job well and skill attainment in bowling. There was no difference in mean scores between the two groups on the motive of the need to do a job well but the bowling group scored significantly higher on the motive of the need to be a success than the riflery group.

Usher (1975) studied achievement motivation in 54 adolescent soccer players from one of three competitive performance levels (National, Provincial, and Club groups). He measured players using Costello's (1967) scales on need to do well at a task (GN) and need to be a success (GS) as well as two sport-specific scales he modified from Costello's: need to do a task well specific to soccer (TSS) and need to be a success specific to soccer (SSS).

Usher reported that the provincial and club players scored significantly higher on the scale need to do well at a task than the national players. He further reported that the provincial group scored significantly higher on the scale need to do well at a task specific to soccer than both the club and national groups.

Usher noted the following significant correlations:

1. Need to do well at a task (GN) and need to do a task well specific to soccer (TSS): $r = .46$ and $.55$ for the provincial and club groups respectively.
2. Need to be a success (GS) and need to be a success specific

to soccer (SSS): $r = .48$, $.80$, and $.84$ for the national, provincial, and club groups respectively; and

3. Need to do a task well specific to soccer (TSS) and need to be a success specific to soccer (SSS): $r = .47$ and $.53$ for the national and club groups respectively. There were no significant correlations between need to do well at a task (GN) and need to be a success (GS).

Usher (1975) noted that achievement refers to doing a task well and success emphasizes social rewards and further noted that achievement and success are different but related and thus suggested (albeit incorrectly) that one should therefore expect a high negative correlation between the two constructs (GN and GS). As well, he further incorrectly suggested that one should expect high negative correlations between the scales of TSS and SSS, GS and SSS, and GN and TSS.

It would be more correct to suggest that one would expect low to moderate positive correlations between the constructs of excellence and success in both general and sport-specific situations (i.e., GN and GS, TSS and SSS) as well as between a situation-specific measure of a construct and a general measure of the same construct (i.e., GN and TSS, GS and SSS). A number of the correlations reported above in fact support these more realistic and more correctly suggested relationships. The unusually high correlations for two groups between the scales of GS and SSS may be in part attributed to the fact that the modified soccer specific scales are in fact very similar to Costello's (1967) original scales.

Burnstein, Moulton and Liberty (1963) differentiated between

prestige and excellence as determinants of role attractiveness. They found that:

. . . individuals high in achievement motivation and in achievement values prefer occupational roles which demand high excellence relative to the prestige they confer while individuals low in achievement motivation and in achievement values prefer those which confer high prestige relative to the excellence demanded. (Burnstein et al., 1963:212)

Rotella (1978) has suggested that the involvement in sport by individuals low in achievement motivation can be explained by extrinsic rewards (e.g., trophies, jackets, parental and peer praise) which are constantly given out for athletic participation. Thus, Rotella is also acknowledging a differentiation between individuals motivated by excellence incentives and those motivated by success incentives. Singer (1979) not only provided support for the distinction between individuals motivated by either one of these two incentives but he also suggested that excellence incentives are more personally desirable. Singer remarked that "motivation to perform for rewards, winning in competition, recognition, and other externally-directed outcomes are not as personally desirable as motivation to perform for competence, achievement, fulfillment, expression, and satisfaction" (1979:37). Participation in sport can be further understood in light of the fact that sport is one avenue in which a young person can achieve and be recognized for that achievement prior to adulthood (Weiss, 1969).

Kagan and Moss (1962) reported on 30 years of research on individuals who had been members of the Fels Research Institute's longitudinal population since their birth. They studied the psychological development of 89 individuals (45 females and 44 males) from birth through early adulthood. In contrast to the previously reviewed

research that distinguished between excellence and success motives, Kagan and Moss considered the needs for achievement and recognition together since they assumed that the overt behaviors that gratify these needs overlap to a large extent. They defined achievement as behavior aimed at satisfaction of an internal standard of excellence. The goal of achievement behavior was "self-approval for performing tasks at a level of competence that an individual had previously established as satisfying. In recognition behavior, the goal is some positive reaction from other people--a social acknowledgement of the individual's skill" (Kagan and Moss, 1962:120).

The areas of competence that were most highly valued by the sample were: intellectual, athletic, mechanical and artistic abilities. Competence in these areas brought feelings of self-satisfaction; however, acquisition of these skills also resulted in social recognition. Kagan and Moss (1962) observed that:

Family, peers, and teachers awarded praise and prizes for academic, athletic, or artistic achievements. Hence it is extremely difficult to differentiate achievement and recognition motives. Involvement in school work or long hours of baseball practice can indicate strong achievement or recognition motives or both. (p. 121)

Kagan and Moss (1962) reported that the data revealed a high positive correlation between achievement and recognition behaviors. They suggested that this could mean either methods of data collection were not sensitive enough to separate the two motives, or that it is indeed not possible to measure "the desire to improve at a skill independent of the person's desire for social recognition for this improvement" (p. 121).

However, in the present study, and contrary to Kagan and Moss

(1962), it is hypothesized that these two incentives (excellence and success) can be sought independently. That is, there is an attractiveness to the individual to improve personal skills (i.e., excellence) without necessarily a concomitant need for social recognition (i.e., success) of these accomplishments.

Athletes motivated by success incentives do not particularly care "how well" they perform just as long as they win and receive public approval for their winning; whereas, "how well" athletes perform both in front of other people and on their own by themselves is of major importance to athletes motivated by excellence incentives. Thus, for athletes motivated by excellence incentives, doing something well is attractive regardless of whether the individual wins or not. Also, for athletes motivated by success incentives, public recognition that a task is successful is all that is required for these athletes to feel that they have successfully completed the task. However, for individuals motivated by excellence incentives it is necessary for these individuals to have personal psychological feelings of having successfully completed the task (Birch and Veroff, 1966).

Thus, from this literature review on the success incentive system, success incentives in sport were characterized by the opportunities for athletes to receive prestige, recognition, status, and social approval for their achievements (Alderman and Wood, 1976). The success incentive system has some similarities to what Watson (1976) identified as extrinsic reward as one of the components of game attraction for young athletes, and to what Berlin (1974) had labelled as satisfaction

of adjustment and recognition as one of the factors to explain the motivations of collegiate women athletes. Success incentives in sport loaded on the factors of self-task and provincial in Garvie's study (1979).

Aggression Incentive System

Aggression as a psychological construct is difficult to characterize. Tedeschi, Smith III, and Brown, Jr. (1974) observed that:

Aggression had been considered an instinct, a drive, a basic energy source, an emotion, an intention to do harm, and a class of behaviors. Each definition of aggression has been subjected to much criticism and many theorists have expressed their dissatisfaction with the concept as developed. (p. 540)

Smith (1972) noted that "human aggression is both complex and multifaceted: it may be expressed in behavior or in fantasy; it may be symbolic or direct; it may or may not be underpinned by feelings of hostility" (p. 91). Edmunds (1978) reiterated that different types of motives may underlie aggressive behaviors.

The explanations for aggression generally fall under three major classes of psychological theories: instinct (e.g., Lorenz, 1966), frustration-aggression (e.g., Berkowitz, 1962, 1969; Dollard, Doob, Miller, Mowrer, and Sears, 1939), and social learning (e.g., Bandura, 1973, 1978). Despite a very large body of research on aggression emanating from the biological sciences and the social sciences, very few definitive statements can be made about the determinants of aggression (Smith, 1972). A brief review of these major theories follows.

Instinct theories of human aggression assume that man is naturally aggressive. Support for this biologically-based explanation of aggression comes from psychiatric and psychoanalytic case studies and from observation of animals. Freud originated the instinctive interpretation of aggression. He postulated that man is born with a death instinct which, when turned outward, results in aggression. According to Freud, aggressive impulses, which are constantly generated by internal processes, require periodic releases through overt aggressive acts so that they don't build up to dangerous levels and result in self-destruction (Berkowitz, 1962; Smith, 1972). Although very few psychoanalysts accept Freud's hypothesis of a death instinct, they, nevertheless, support the instinctive nature of aggression but they have also accepted the evidence that aggressive behavior may be modified by learning (Berkowitz, 1962; Layman, 1970; Smith, 1972).

Based upon an ethological perspective, Lorenz (1966) presented a revised version of instinct theory. He suggested that aggression is genetically determined being the product of a long process of evolution. Through this process, animal species have developed inhibitions against attacking members of their own species but in man these aggression-inhibiting mechanisms are no longer strong enough to balance his capacity to injure or kill as the latter has increased rapidly through technology. To control man's aggressive drive, Lorenz suggested a redirection of it into safer outlets. Thus, he saw sport serving a function for the cathartic release of aggression. According to the catharsis hypothesis, built-up aggressive energy is released through aggressive behaviors resulting in reduced tension

and decreased instigations to aggression (Layman, 1970; Tedeschi et al., 1974). The application of the catharsis hypothesis to participation in sport has been criticized as studies have yielded virtually no scientific support for its verification (Berkowitz, 1970, 1978; Layman, 1970; Smith, 1972; and Tedeschi et al., 1974).

According to the frustration-aggression theory, aggressive behavior is said to result from the arousal of a frustration-produced drive. Dollard and his colleagues (Dollard et al., 1939) first proposed the frustration-aggression hypothesis. The essence of their hypothesis was: "aggression is always a consequence of frustration" (Dollard et al., 1939:1). More specifically, they delineated two propositions as the basis of this hypothesis: 1) "the occurrence of aggressive behavior always presupposes the existence of frustration," and 2) "the existence of frustration always leads to some form of aggression" (Dollard et al., 1939:1).

Immediate criticism of the original frustration-aggression hypothesis by the Yale group of psychologists caused one member of the group to amend the hypothesis. Miller (1941) maintained that "the occurrence of aggression always presupposes frustration" but he modified the second proposition to read: "Frustration produced instigations to a number of different types of responses, one of which is an instigation to some form of aggression" (p. 338).

Although the frustration-aggression hypothesis as originally espoused by Dollard et al. (1939) and in an amended form by Miller (1941) has been subjected to much criticism, this hypothesis served as a stimulus for clinical and experimental studies of aggression

which have resulted in modifications to the original hypothesis as well as Miller's 1941 version (Layman, 1970; Smith, 1972). Berkowitz (1962, 1969, 1978) provided comprehensive discussions of criticisms of the frustration-aggression hypothesis.

Berkowitz (1962, 1969, 1978) provided experimental evidence to show that "the existence of frustration does not always lead to some form of aggression, and the occurrence of aggression does not necessarily presuppose the existence of frustration" (Berkowitz, 1969:2). Berkowitz (1978) noted that many aggressive acts are instrumental to the attainment of nonaggressive goals even when the individual seeks to hurt someone. According to Berkowitz (1969, 1978) there is no reason to assume that all aggressive actions have been instigated by an earlier frustration. Berkowitz (1962, 1969) reformulated the frustration-aggression hypothesis and suggested that "a frustrating event increases the probability that the thwarted organism will act aggressively soon afterward" (Berkowitz, 1969:2).

Sargent (1948) also noted that it is difficult to defend the Dollard et al. (1939) hypothesis. In particular, he noted that although much behavior resulting from frustration is aggression, frustration may produce other reactions, for example, fear, anxiety, and inferiority.

Thus, studies have provided evidence that aggression has other antecedents, in addition to frustration, such as attack and prior aggressive learning; and that frustrating events are sometimes followed by nonaggressive responses (Berkowitz 1978).

Dollard et al. (1939) also considered catharsis as a factor

influencing the direction of aggression. However, as previously noted (supra, p. 80) there is little convincing evidence for the catharsis hypothesis. Berkowitz (1978) stressed that the catharsis hypothesis should be separated from propositions regarding the relationship between frustration and aggression.

Dollard et al. (1939) implied an innate connection between frustration and aggression in their statement: "the frustration-aggression hypothesis assumes a universal causal relation between frustration and aggression" (p. 10). However, Miller (1941) stated that "no assumptions are made as to whether the frustration-aggression hypothesis is of innate or learned origin" (p. 340). Notwithstanding Miller's statement, criticisms against this innate implication have been presented (Bandura, 1973; Bandura and Walters, 1963). A third approach to the study of aggression--social learning theory--resulted from these criticisms.

Bandura (1973) and Bandura and Walters (1963) disputed the Dollard et al. (1939) position that there is a universal causal relation between frustration and aggression--that is, all aggression has the same fundamental cause--frustration, and that learning is not necessary for frustration to produce aggression. In Bandura's (1973) words:

In social learning theory, rather than frustration generating an aggressive drive, aversive treatment produces a general state of emotional arousal that can facilitate a variety of behaviors, depending on the types of responses the person has learned for coping with stress and their relative effectiveness. (p. 53)

Frustration is included in these aversive experiences and the response behavior may be, but is not necessarily, aggression.

Bandura and Walters (1963) noted that the frustration-aggression hypothesis did not specify how aggressive responses are originally acquired. They presented convincing evidence to show that overt aggression can be socially learned and that frustration is not a necessary condition for aggression as aggression may be expressed even when frustration is low. They also noted the role of social learning (i.e., modeling and reinforcement procedures) in modifying the nature of responses to frustration and cited this as another inadequacy of the frustration-aggression hypothesis.

Berkowitz (1970) reinterpreted the literature on hostility catharsis and his conclusion that aggression is likely to beget more aggression also supported the social learning perspective.

Social learning theory thus assumes that an individual learns aggressive behavior through observations of aggressive models and by being socially reinforced for such behavior. This approach acknowledges a number of antecedents of aggression: e.g., frustration, verbal or physical attack, and exposure to aggressive models. Social learning view of aggression incorporates both individual and environmental determinants. Bandura (1973) summarized this position by stating that: "man is endowed with neurophysiological mechanisms that enable him to behave aggressively, but the activation of these mechanisms depends upon appropriate stimulation and is subject to cortical control" (p. 29).

In a recent review of social learning theory of aggression, Bandura (1978) emphasized that a complete theory of aggression must cover three areas: 1) explain how aggressive patterns are developed

(origins of aggressions), 2) explain what provokes individuals to behave aggressively (instigators of aggression), and 3) explain what sustains aggressive actions after they have been initiated (regulators of aggression). Bandura further noted the determinants of these three aspects of aggression within social learning theory. Some determinants noted were: 1) origins of aggression: observational learning, reinforced performance; 2) instigators of aggression: modeling influences (e.g., facilitative, disinhibitory), aversive treatment (e.g., physical assaults, verbal threats and insults); and 3) regulators of aggression: external reinforcement (e.g., social and status rewards), punishment, vicarious reinforcement (e.g., observed reward and observed punishment) and self-reinforcement (e.g., self-reward and self-punishment).

In essence, Bandura (1978) reiterated the earlier presentations of the tenets of social learning theory of aggression (Bandura, 1973; Bandura and Walters, 1963). He emphasized that individuals must learn aggressive behavior and that modeling and reinforcement are joint contributors in the social learning theory of aggression. He noted that aggression is largely learned through observation and modeling and refined through various reinforcement techniques.

Layman (1970) defined aggression as the "act of initiating an attack" (p. 27). She delineated two major types of aggression in humans--instrumental and reactive. She defined instrumental aggression as attack in which the major objective was not injury to another individual but attainment of a reward (i.e., attain some goal other than aggression). She further noted that instrumental aggression does not involve anger and guilt nor is it a response to frustration

or noxious stimuli. Layman identified extrinsic reward as the major reinforcer for instrumental aggression.

Layman (1970) defined reactive or goal aggression as attack in which the major objective was the injury of the individual against whom the attack was directed. She further stated that this individual is perceived as an "enemy" who has been the agent of frustration or the originator of a threat of frustration or unpleasantness, or the source of some noxious stimuli. Thus, both perception (i.e., of an enemy) and emotion (i.e., anger) are involved. Reactive aggression also involved emotional responses to stimuli which are often displaced to objects or persons other than the original source as well as involving the presence of guilt feelings. Layman identified stimulus of the victim suffering injury or being in pain as the major reinforcer for reactive aggression.

Layman (1970) proposed that for many athletes, competitive sports involve principally instrumental aggression. She specified that the athlete attempted to defeat his opponent not because he is really angry at his opponent (i.e., reactive aggression) but for other reasons such as the approval that results from winning or the subjective satisfaction he experiences from proving his own competence. Thus, the athlete displayed aggression as a means of attaining other goals. However, she also acknowledged that reactive aggression is a viable incentive for some athletes. She explained this by noting that since winning in sports always involves injury to another, either physically or psychologically, there are athletes who have to perceive their opponents as the enemy and become angry with them in order to

force themselves to win.

Buss (1971) distinguished between aggression intended to inflict suffering on the victim and aggression directed towards the acquisition of extrinsic rewards. Similarly Feshbach (1970) used the term hostile aggression to refer to behavior primarily intended to hurt the victim and the term instrumental aggression to refer to behavior aimed at acquiring rewards for oneself. Buss's and Feshbach's classifications of types of aggression were similar to Layman's delineation of aggression into reactive and instrumental types.

In a review of the literature on adult male and female aggression, Frodi, Macaulay, and Thome (1977) used Berkowitz's (1964) definitions to define aggression and anger. Berkowitz (1964) defined aggression as "behavior whose goal is the injury of some person or object" and anger was defined as "the emotional state resulting from a frustration presumably creating a readiness for aggressive acts" (p. 104). Frodi et al. (1977) categorized aggression as physical versus verbal and direct versus indirect.

Physical aggression was defined as "any response that produces or is intended to produce physical injury or physical pain in the victim or damage to an object" (Frodi et al., 1977:635-636). The delivery of electric shock has been almost exclusively the physical response studied among adults. Verbal aggression was defined as "any response that produces psychological or social harm to the victim--hurt feelings, damage to one's reputation, devaluation that could result in loss of a prize, a job, others' esteem" (Frodi et al., 1977:636). Also included in this verbal category were fantasies of

physical aggression and nonverbal aggressive expressions (e.g., honking at errant drivers).

Frodi et al. (1977) defined direct aggression as "that which has as a target the instigation of anger, or the person who provoked the aggressive behavior" (p. 636). Included in direct aggression were subcategories corresponding to method of delivery: e.g., face-to-face, institutional, devious. Indirect aggression was defined as "aggression with a substitute target (not the instigator or provoker) or no concrete target at all" (Frodi et al., 1977:636). Subcategories of indirect aggression included expressions of hostility that would not affect the instigator as well as general expressions of hostility (e.g., those measured by self-report and projective tests).

Frodi et al.'s (1977) review of the experimental literature on adult aggression did not support the commonly held hypotheses that men are always more physically aggressive than women, and that women display more indirect aggression. No definite conclusion about the validity of hypotheses concerning sex-related differences in response preference can be set forth by the available evidence. Only in self-report measures of general hostility or aggressiveness where men report more overt or explicit aggressiveness than women was there evidence for the type of sex differences that sex role stereotypes predict. Frodi et al. found stronger evidence for hypotheses concerning factors other than mode of response that might produce sex differences. These factors included sex of the instigator and/or victim of aggression, empathy with the victim, guilt, and aggression anxiety. However, when these factors were controlled, and aggression

is perceived as justified or prosocial, women may act as aggressively as men.

Edmunds (1978) stressed the possible importance of the victim's contribution to the aggressive encounter in differentiation of types of aggression. He distinguished between reactive aggressive which occurs in response to attack or some other form of noxious stimulus presented by the victim (i.e., victim-precipitated) and initiatory aggression which is started by the aggressor himself without prior provocation from the victim. Edmunds asserted that hostile-instrumental and reactive-initiatory distinctions are conceptually independent although he remarked that several other researchers have frequently confounded the reactive-initiatory distinctions with differences between the motives for aggression. He identified four broad classes of aggressive behavior: 1) initiatory instrumental (e.g., robbery with violence), 2) reactive instrumental (e.g., defence of property), 3) reactive hostile (e.g., to hurt an attacker), and 4) initiatory hostile (e.g., to hurt an innocent victim).

Feshbach (1971) expressed that aggression may be either personal (which includes both hostile and instrumental motives) or social (in the service of society or another individual). He further suggested that personal aggression is disapproved and social aggression is approved. Edmunds (1978) compared evaluations of male and female undergraduates on social aggression and the four types of personal aggression previously identified by the hostile-instrumental and reactive-initiatory distinctions. These different types of aggressive behavior were evaluated on several dimensions using five-point bipolar

scales: justification for the behavior, aggressiveness of attacker, extent to which subjects would behave in a similar manner to attacker, extent to which attacker should be punished or praised, and the subjects' approval of attacker.

Two-way analysis of variance with repeated measures on type of aggression factor revealed a significant type of aggression factor (for each measure). Social aggression was evaluated more favorably than three of the four types of personal aggression. With the fourth type, reactive instrumental aggression, social aggression differed significantly only on the punishment-praise evaluation which indicated that subjects regarded social aggression as more praiseworthy. Reactive aggression was evaluated significantly more favorably on all measures than initiatory aggression (for both hostile and instrumental motives). In addition, reactive instrumental was evaluated more favorably on all scales than reactive hostile aggression. Initiatory instrumental aggression was judged more unfavorably than initiatory hostile aggression on all measures, and significantly so on all measures but aggressiveness. Of the four types of personal aggression, reactive instrumental and initiatory instrumental received, respectively, the most favorable and unfavorable evaluations.

An interesting result was the subjects' similarity ratings which indicated the degree to which they would behave in a similar manner to the hypothetical respondent. The correlations showed little generality of behavior across the various motives and circumstances. Edmunds (1978) suggested that specific measures for the various types of aggressive behavior would seem to be required for more accurate

assessment and prediction of these various aggressive behaviors.

Birch and Veroff (1966) have stated that the goal of the aggression incentive system is the "condition of intentionally injuring another organism, with the greater the injury, the greater the incentive" (p. 70). This view implied a reactive or goal aggression. That is, the goal response is the injury of the person against whom the attack is directed with no other goal being sought (Buss, 1971; Feshbach, 1970; Frodi et al., 1977; Layman, 1970; Tedeschi et al., 1974).

This aggression incentive system also appears to be related to the affiliation incentive system. That is, if an individual injures another person, he is potentially displeasing that person and in doing so, he is interfering with potential affiliation incentives.

Very few individuals in sport or in any other domain of society would desire or even admit to the attractiveness of the opportunity to intentionally physically injure another person. The major emphasis in defining the aggression incentive system is on psychological injury and a more restrictive definition of physical injury. Emanating from this literature review on the aggression incentive system, aggression incentives in sport were characterized by the opportunities for athletes to physically dominate and intimidate other athletes and to psychologically humiliate and intimidate other athletes (Alderman and Wood, 1976). This aggression incentive system has some similarities to what Butt (1979) identified as aggression as one of the psychological motivation components in her model of sport motivation. Aggression incentives in sport loaded negatively on Garvie's (1979)

provincial factor.

Affiliation Incentive System

The study of the construct of affiliation has been limited, until recently, to theoretical propositions on specific dimensions of this construct (e.g., Byrne, 1971; Festinger, 1954; and Schachter, 1959). Although the value of these specific studies in contributing to an understanding of affiliation is without question, it is nevertheless, desirable to provide an overall conceptual framework from which to more meaningfully study this construct. Mehrabian and Ksionzky (1970, 1974) in assigning affiliation the position of the most important component of social interaction attempted to integrate the many diverse studies within a single conceptual framework. A review follows of the more pertinent studies on specific dimensions of affiliation as well as of the most relevant aspects of the tentative theory of affiliation as put forth by Mehrabian and Ksionzky.

The primary situational determinants and target attributes of the affiliative tendency in individuals have been identified by researchers as: uncertainty (e.g., Festinger, 1954), stress (e.g., Schachter, 1959) and the attractiveness of targets of affiliation (e.g., Byrne, 1971). All three of these variables are very much interrelated.

Uncertainty about an individual's own abilities and opinions is distressing; this distress can be reduced through social comparison (Mehrabian and Ksionzky, 1970, 1974). Festinger (1954) in his

theory of social comparison processes proposed that "there exists, in the human organism, a drive to evaluate his opinions and his abilities" (p. 117). His investigations of an individual's need to evaluate his own opinions and abilities led him to the following conclusions: 1) In situations where there is ambiguity about the norms of behavior or objective standards for comparison are non-existent, an individual turns to others to evaluate his opinions and abilities; 2) An individual uses similar others for comparison purposes as they can provide the most relevant, accurate, and meaningful information for evaluating his opinions or abilities; 3) An individual's evaluations become unstable if he is unable to compare his opinions and abilities with similar others. The majority of results from a series of later studies (reviewed in Mehrabian and Ksionzky, 1970, 1974) which included an uncertainty manipulation as a determinant of affiliation have been consistent with Festinger's (1954) conclusions.

The extension of Festinger's (1954) theory of social comparison processes to include emotions linked his work to that of Schachter's (1959). Schachter's research dealt with one emotional state--anxiety, and more specifically, anxiety generated by physical fear. Using primarily undergraduate students as subjects, his experiments on affiliation revealed that fear induced by anticipation of a threatening event promotes the desire for affiliation with others in a similar situation. Thus, under conditions of anxiety, the affiliative tendency in individuals is highly directional. He suggested that the affiliative goal serves to reduce the anxious subject's own fears (i.e., anxiety reduction) as well as to reduce confusion about the

emotions an individual has regarding certain anxious situations as a result of evaluating his own feelings by comparison with similar others (social evaluation). Thus, Schachter has shown that satisfaction of the needs aroused by fear of imminent pain requires affiliation with others in a similar situation. Furthermore, the opportunity to communicate verbally was not necessary for such a desire for affiliation.

Zimbardo and Formica (1963) provided further evidence for the model of emotional comparison processes used by Schachter (1959) as an explanation of why people affiliate when they are confronted with an impending threat. Data of male undergraduate students indicated that fearful subjects (fear was experimentally aroused in subjects by leading them to believe they were to receive painful electrical shocks) affiliated significantly more than those who were not fearful, even when the opportunity to communicate verbally was restricted. Also, affiliation was significantly greater when fearful subjects expected that those with whom they could wait were in an emotional state similar to their own than when the others had relevant information about the threatening event but not similar emotions.

Thus, studies by Schachter (1959) and Zimbardo and Formica (1963) support the contention that a major reason for affiliation is emotional comparison (i.e., "the need to identify the emotional state one is experiencing, and to seek normative information about the appropriateness of one's emotional behavior" (Zimbardo and Formica, 1963:141)). Birch and Veroff (1966) defined the affiliation incentive as the "attraction to another organism in order to feel reassured

from the other that the self is acceptable" (p. 65). This view of affiliation is similar to the literature presented on both emotional comparison processes and the more general social comparison processes as originally presented by Festinger (1954).

Byrne (1971) concluded that interpersonal attraction increased linearly with self-target attitude similarity. Studying undergraduate students, he used responses to two items indicating liking and willingness to work with another person as a composite measure of interpersonal attraction. Results of his studies with other subject populations (e.g., children and young adults--grades 4-12, cross-cultural groups) also indicated that individuals generally have a greater attractiveness to others who hold more similar attitudes. Some of the earlier work carried out by Festinger (1954), Schachter (1959), and Zimbardo and Formica (1963) as well as other studies reviewed by Mehrabian and Ksionzky (1970, 1974) which investigated social comparison included the possibility of subjects interacting with similar versus dissimilar others. The results of these studies were all consistent with Byrne's results of individuals' preferences to affiliate with more similar targets.

Byrne (1971) also studied interpersonal attraction as a function of need for affiliation (n affiliation) as well as attitude similarity. Results of two studies indicated significant main effects for both factors (i.e., n affiliation and attitude similarity) as well as a significant interaction between the two factors. Ignoring levels of affiliation, the usual similarity-attraction function was confirmed. Individuals high in affiliation need tended to respond more positively

to strangers than those low in affiliation need, except at the lowest levels of similarity of attitudes. In fact, results indicated that low n affiliation subjects were indifferent to strangers except at relatively high levels of similarity. Medium n affiliation subjects responded like the high n affiliation subjects at the upper levels of similarity (i.e., were highly attracted) but gave the most negative responses (i.e., lowest attraction scores) at the lower levels of similarity of attitudes. Byrne (1971) proposed that:

. . . high n Aff [affiliation subjects] indicated primarily an approach motive and positive attitudes towards others, that low n Aff [affiliation subjects] indicated [primarily] an avoidance motive and negative or indifferent attitudes towards others, and that medium n Aff [affiliation subjects] indicated [primarily] conflicted individuals who desired to affiliate but strongly feared rejection. (pp. 225-226)

To measure individual differences in affiliation, Heyns, Veroff, and Atkinson (1958) developed a scoring system for a thematic apperceptive measure (TAT) of the need for affiliation (n Affiliation). Their scoring procedures included revisions and extensions of the scoring criteria for the TAT measure of n Affiliation originally developed by Shipley and Veroff (1952). Heyns et al. based these revisions and extensions on data obtained from an experiment (Atkinson, Heyns, and Veroff, 1954) using similar experimental conditions to that of Shipley and Veroff, as well as by reanalysis of Shipley and Veroff's data. Although Shipley and Veroff suggested that affiliation motivation was composed of both positive and negative tendencies of individuals, their scoring system measured almost exclusively that aspect of n Affiliation characterized by fear of rejection. That is, affiliation imagery was scored in terms of separation anxiety--the

story contained evidence of concern over either separation from another or possible separation. Atkinson et al. (1954) provided a broader definition of affiliation imagery to include both positive and negative affiliation tendencies. Affiliation imagery was scored when the story contained "any evidence of concern over establishing or maintaining a positive affective relationship with another person(s) in addition to concern over restoring broken relationships" (Atkinson et al., 1954:407). Thus, the measure of affiliative tendency as proposed by Heyns et al. (1958) was based on the implicit assumption of a single dimension of affiliation. This scoring system of Heyns et al. for measuring n Affiliation has been used extensively in future studies of affiliation.

French and Chadwick (1956) defined affiliation motivation "as a desire to establish and/or maintain warm and friendly interpersonal relations" (p. 296). Although their measure of affiliation motivation included a total score, a positive score, and a negative score for each subject, they essentially considered affiliation motivation on a single dimension being composed of both approach responses toward affiliation and avoidance responses toward rejection. Other measures of affiliation (e.g., Edwards, 1959; French, 1958; and Jackson, 1974) have also assumed affiliation was organized along a single dimension.

To be able to integrate the diverse findings reported in the literature, Mehrabian and Ksionzky (1970, 1974) felt it was necessary to not only identify two distinct dimensions of affiliative attributes but also to separately measure these two dimensions. Within

their two-dimensional framework, individuals were characterized by the extent to which they generally expect interactions with others to be both positively reinforcing and negatively reinforcing. They viewed positive and negative reinforcement as independent dimensions of interpersonal relationships. That is, positive reinforcers were distinct from, and not necessarily the converse of, negative reinforcers. Their review of a number of studies indicated that an affiliation confounded these two individual difference variables and thus provided justification for their two-dimensional framework.

Mehrabian and Ksionzky (1970, 1974) conceptualized affiliation primarily as a function of positive and negative affiliative characteristics, target attributes, and situational variables. Using undergraduate students as subjects, scales of affiliative tendency and sensitivity to rejection (Mehrabian, 1970; Mehrabian and Ksionzky, 1974) were developed to measure generalized expectations of others' positive and negative reinforcing qualities respectively. They felt these scales are of major value when studying social interactions among strangers. They also developed a sociometric questionnaire (Mehrabian and Ksionzky, 1974) to measure the actual reinforcing qualities of individuals familiar with each other in close social groups. By use of audio and visual recordings of subjects' interactions, Mehrabian and Ksionzky (1974) attempted to measure affiliation on verbal and nonverbal behavioral cues. They identified behavioral correlates of both affiliative tendency and sensitivity to rejection. As their major concern was in identifying variables which accounted for the greatest amount of variance in the dependent

variable of affiliation, they used primarily multiple regression analyses to test the various hypotheses of their model.

Situational determinants of affiliation such as uncertainty and stress were explained in the Mehrabian and Ksionzky (1970, 1974) model by the reinforcing consequences of affiliation. That is, affiliation was increased in situations where positive reinforcement increased or negative reinforcement decreased. Also, a target's positive or negative reinforcing qualities were relevant in eliciting affiliation. Studies of social comparison previously reviewed (Festinger, 1954; Schachter, 1959) supported Mehrabian and Ksionzky's (1970, 1974) findings in that affiliation was desired more with targets who were more positively reinforcing. Their studies suggested that others were more attractive targets for affiliation when they could help reduce uncertainty and stress. Also, the direct relationship shown between self-target attitude similarity and attraction (Byrne, 1971) was consistent with the hypothesized effects of reinforcers on affiliation. That is, positive reinforcers increased in frequency when similar attitudes were shared and negative reinforcers were associated with dissimilar attitudes.

In a study investigating the effects of motivational variables on athletes' performances, Sorrentino and Sheppard (1978) identified experienced intercollegiate swimmers as either approval-oriented individuals or rejection-threatened individuals. This conceptualization of positive and negative components of affiliation motivation paralleled fairly closely that presented by Mehrabian and Ksionzky (1974). A resultant measure of affiliation motivation was obtained

by subtracting fear-of-social rejection z scores (obtained using Mehrabian's 1970 measure of sensitivity to rejection scale) from n Affiliation z scores (obtained using TAT scoring manual of Heyns et al., 1958). Findings indicated, as predicted, that approval-oriented swimmers had faster swimming times in group than in individual competition ($p < .001$) while rejection-threatened swimmers had slower swimming times in group than in individual competition ($p < .001$). Thus, it appeared that approval-oriented swimmers were positively aroused by their perceptions of available positive affiliation incentives should they succeed and thus increased their performance efforts because of those incentives. The rejection-threatened swimmers were negatively aroused by their perceptions of available negative affiliation incentives should they fail and, consequently, they were inhibited to perform which led to decreases in performance.

Baker (1979) noted that affiliation has become an umbrella term with a difference in exact meaning according to the context in which the term is researched. He specified three major differing contexts in which the term affiliation has been researched. Affiliation was first studied as a personality test variable (e.g., Heyns et al., 1958). The second major use of the term was in describing the preference of subjects for company in anxiety-provoking situations as affiliative behavior (e.g., Schachter, 1959). The third major use of the term was by Mehrabian and Ksionzky (1974) who attempted to integrate various elements of affiliation research in terms of positive and negative reinforcing properties of affiliation. Baker suggested that a comparison of the TAT measure of affiliation developed by Heyns et al.

(1958) was different in context and aim to Mehrabian's Scale of Affiliative Tendency (Mehrabian and Ksionzky, 1974). Baker further specified that the TAT scoring system defined affiliation as warm, friendly, affective, and companionate relationships whereas Mehrabian's Scale includes items that implied social interaction with aims other than mere friendship.

Baker (1979) had 151 girls and boys fourteen and fifteen years old complete an inventory of 128 items that covered a variety of social behaviors. Items were gathered from several tests although they were rewritten to provide a uniform format of simple statements suitable for the student group. Factor analysis of the responses resulted in the identification of seven factors.

Factor 1, accounting for 27% of the total variance was labelled as the approach need for affiliation. Statements with significant loadings referred to the pleasure, value, or desire of close friendships. Factor 2, accounting for 12% of the total variance, was identified as sociability. Significant statements loading on factor 2 referred to making new friends, being sociable, desiring to have many friends, and having the skill and ability to make friends. Significant statements loading on factor 3 concerned anxieties and worries about relationships with others--including fear of not being liked, shyness, and fear of rejection. This factor was identified as sensitivity to rejection or alternatively as avoidance affiliation motivation.

Factor 4 was labelled nurturance and consisted of statements concerned with helping, caring, and sympathizing. Factor 5 was

identified as need for solitude and statements for this factor covered the desire for seclusion, privacy, and autonomy. Significant statements loading on factor 6 covered a variety of reasons for friendship--sharing difficulties, misfortunes and secrets, sharing anxieties, enjoyment of letter and telephone correspondence, and confiding and being confided in. This factor 6 was identified as self-evaluation needs. Factor 7 represented the dichotomy between close friendship and brief acquaintanceship. Statements for this factor reflected the preference for fleeting friendships versus the desire for close and lasting friendships.

Baker (1979) concluded that the results strongly suggested that the term affiliation should be restricted to refer to "the motive for warm, close, intimate personal relationships as apart from sociability which refers to the preference for wider, less intimate social relationships" (p. 99).

Thus, from this literature review on the affiliation incentive system, affiliation incentives in sport were characterized by the opportunities for athletes to attain, maintain, and consolidate warm, interpersonal relationships (primarily with other athletes and coaches) (Alderman and Wood, 1976). This affiliation incentive system has some similarities to what Berlin (1974) had identified as consequences of affiliation as one of the factors to explain the motivations of collegiate women athletes, and to what Watson (1976) identified as social reciprocity as one of the components of game attraction for young athletes. The affiliation incentive system is also related to the subdomain of physical activity as a social experience which

Kenyon (1968a) had postulated as one of the six subdomains to characterize physical activity as a sociopsychological phenomenon. Affiliation and independence incentives in sport loaded positively and negatively respectively on the factor labelled affiliation in Garvie's (1979) study.

Chapter III

METHODS AND PROCEDURES

Chapter III is divided into two major sections. The reporting of the results of a pilot study which formed the basis for the present study comprises the first section. The methods and procedures carried out for the present study forms the second and final section to this chapter.

PILOT STUDY: INTIAL DEVELOPMENT OF THE INSTRUMENT

Purpose of the Pilot Study

The primary purpose of the pilot study was to examine the viability of using the construct of incentive motivation in sport to analyze the motivations of athletes. Specifically, the purpose was to operationalize the construct of incentive motivation in sport in order to provide for its measurement via an inventory of items. Specific aspects of the results of the pilot study have also been reported in two papers by Alderman and Wood (1975, 1976).

Description of the Scales

As previously outlined in Chapter I (supra, p. 2), the paradigm of human motivation incentive systems as set forth by Birch and Veroff (1966) was modified for the examination of the motivations of athletes. Based on a literature review of the major incentive systems, theoretically-oriented characterizations of each of the

scales of the inventory were formulated. Each scale was designed to measure one of seven major incentive systems. A description of each scale is presented in Table 1. Each scale is described in terms of the incentives that each system provides to athletes.

Table 1
Characterizations of the Seven Scales
Comprising the Inventory

Scale	Characterization
Independence	Opportunities for athletes to do things on their own without the advice or criticism of any other person (primarily other athletes and coaches).
Power	Opportunities for athletes to influence, change, and control the opinions and attitudes other people (primarily other athletes and coaches) have toward them.
Affiliation	Opportunities for athletes to attain, maintain, and consolidate warm, interpersonal relationships (primarily with other athletes and coaches).
Arousal ^a	Opportunities for athletes to have exciting, interesting, and sensory experiences primarily in terms of novelty, uncertainty, and complexity.
Esteem ^b	Opportunities for athletes to receive prestige, recognition, status, and social approval for their achievements.
Excellence	Opportunities for athletes to do something extremely well or to be very good at something--that is, to successfully compete against a standard of excellence.
Aggression	Opportunities for athletes to physically dominate and intimidate other athletes and to psychologically humiliate and intimidate other athletes.

Note. Descriptions are adapted from Alderman and Wood (1976).

^aRelabelled Stress in the present study.

^bRelabelled Success in the present study.

Construction of the Scales' Items

A central principle in the description of the scales and in the construction of the items to measure these scales was that the validation process should be integrated with all facets of inventory construction rather than something that is of concern only when the inventory is in its final form. Loevinger (1957) expressed this viewpoint in her classic monograph. She suggested that the validation process could be divided into three mutually exclusive major components--substantive, structural, and external. Each of these components is a necessary stage in inventory development but no single component is sufficient by itself. According to Loevinger, these three aspects of validity are respectively closely related to three orderly stages in test construction: "constitution of the pool of items [substantive], analysis of the internal structure of the pool of items and consequent selection of items to form a scoring key [structural], and correlation of test scores with criteria and other variables [external]" (Loevinger, 1957:654).

The substantive component of validity refers to the extent to which the content of the items comprising the test reflect via a theoretical basis an appropriate universe of content. This substantive component is similar to Lennon's (1956) formulation of content validity and to the theory of generalizability of Cronbach, Rajaratnam, and Gleser (1963). The structural component of validity refers to the extent to which item responses conform

to a specified structural model. The external component of validity refers to the degree of correspondence of the constructs of the test to non-test manifestations of these constructs and to other variables (Loevinger, 1957).

Initially, the items were constructed with the substantive component of validity in mind. Thus, a large pool of approximately 500 items were gathered from several inventories² measuring general motives, attitudes, and interests of people. Those items that were hypothesized to bear some direct relevance to the scales being measured were chosen for further scrutiny. All items were rewritten to be specific to sport situations. Face validity was evident from a perusal of the items as all items were written to be specific to sport situations. The initial content validity of these items was determined by a screening process via a panel of experts and graduate students in sport psychology. The final selection of items included in the inventory was based on the content validity of each of the items in relationship to its relevant scale. The final pool of items consisted of 84 statements, 12 statements for each of the seven scales.

²Inventories examined included: The Adjective Check List (ACL) (Gough and Heilbrun, Jr., 1972); California Psychological Inventory (CPI) (Gough, 1975); Edwards Personality Inventory (EPI) (Edwards, 1967); Edwards Personal Preference Schedule (EPPS) (Edwards, 1959); Sixteen Personality Factor Questionnaire (16 PF) (Cattell and Eber, 1966); Study of Values: A Scale For Measuring the Dominant Interests in Personality (SV) (Allport, Vernon, and Lindzey, 1970); and Survey of Interpersonal Values (SIV) (Gordon, 1960).

Format of the Inventory

The ordering of the items in the inventory was designed to provide repeated measures of each of the seven scales in the following order: independence, power, affiliation, arousal, esteem, excellence, and aggression. Thus every seventh statement provided a measure of an aspect of one specific scale (e.g. statements 1, 8, 15, . . . 78 were designed to assess the independence scale).

Instructions for responding to the inventory were provided on the first page of the inventory. The athletes responded to each of the items on the basis of a four choice continuum (always, sometimes, seldom, and never). Thus, one of these four choices was checked for each of the 84 statements.

Responses to the inventory were quantified on a 4-point scale. That is, scores of 4, 3, 2, and 1 were assigned respectively to the responses "always," "sometimes," "seldom," and "never." The five reverse items were scored in the opposite direction. Thus, the minimum score an individual could receive for each incentive scale was 12 while the maximum possible score was 48.

Testing of the Inventory

The inventory was administered to a total of 907 male and female athletes who attended the Summer Sports Camps at the University of Alberta, Edmonton, Alberta during the summer of 1975. The sample ranged in age from 11 to 18 years. A summary of the groups of athletes tested is presented in Table 2.

Table 2
Athletes Tested on the Inventory

Group Identification	Age (Years)	Number (n)	Sport(s)
Male 1	11-14	425	Hockey
Male 2	11-14	96	Basketball, Soccer, Swimming, Volleyball, Wrestling
Male 3	15-18	112	Hockey
Male 4	15-18	105	Basketball, Soccer, Volleyball, Wrestling
Female 1	11-14	103	Basketball, Field Hockey, Swimming, Volleyball
Female 2	15-18	66	Basketball, Field Hockey, Swimming, Volleyball
		907	

Statistical Analyses of the Scales

Descriptive Statistics

Table 3 presents the means and standard deviations of the seven incentive scales for each of the six groups of athletes tested. The incentive scales of affiliation, excellence, arousal, and esteem had the highest mean scores for all six groups and, further, consistently ranged from high to low in that order. The incentive scales of aggression, power, and independence had the lowest mean scores.

Table 3

Means and Standard Deviations of Incentive Scales
for the Groups of Athletes Tested

Group Identi- fication	Independence		Power		Affiliation		Arousal		Esteem		Excellence		Aggression	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Male 1	27.4	4.4	28.3	4.2	37.6	3.8	34.8	3.4	32.9	4.1	36.2	4.0	30.0	5.4
Male 2	26.3	3.7	28.0	3.9	38.8	3.7	34.7	3.5	32.0	4.2	36.3	3.9	28.4	5.0
Male 3	27.1	4.0	27.9	4.5	38.5	3.7	35.9	3.9	33.8	4.4	37.9	3.8	30.9	5.3
Male 4	25.7	3.8	27.7	4.1	39.1	3.1	36.3	3.3	32.9	4.4	37.8	3.6	27.4	5.1
Female 1	25.5	3.8	24.8	4.1	39.4	3.3	34.2	3.1	30.5	3.7	34.9	4.0	24.2	3.7
Female 2	24.5	3.6	25.3	3.3	39.8	2.9	34.7	3.4	31.4	4.4	35.9	4.1	25.4	4.8

Note. M denotes mean; SD denotes standard deviation.

The mean scores for the seven incentive scales consistently ranged from high to low for four of the six groups. This order was: affiliation, excellence, arousal, esteem, aggression, power, and independence. Although the responses to the inventory were consistently very similar for the age range of 11 to 18 years for both sexes any interpretation of these incentive scales with respect to their ranking and importance to the athletes is not possible without appropriate norms.

It must be pointed out that any presentation of mean scores for the seven incentive scales was purely speculative at this initial stage. That is, there was no empirical evidence to indicate that any one of these seven incentive systems was in fact being measured since any construct validation had not yet been carried out.

Reliability

Kuder-Richardson Formula 20 (K-R 20) reliability coefficients were computed for this data as a measure of internal consistency and item homogeneity. Table 4 presents the K-R 20 coefficients for the seven incentive scales for each of the six groups of athletes tested.

As can be seen from Table 4, the K-R 20's for the incentive scales ranged from .27 to .71. However, 86% of the K-R 20's reported ranged from .41 to .67. In light of the fact that there were only 12 items per scale, the majority of the reliability coefficients reported were considered adequate. The K-R 20's for all scales except the independence and arousal scales for all six groups ranged from .41 to .71.

However, it is also obvious that those items measuring each of

Table 4

K-R 20 Reliability Coefficients of Incentive Scales
for the Groups of Athletes Tested

Group Identification	Independence	Power	Affiliation	Arousal	Esteem	Excellence	Aggression
Male 1	.51	.50	.53	.27	.48	.52	.67
Male 2	.38	.49	.59	.37	.56	.55	.67
Male 3	.44	.66	.60	.52	.61	.55	.67
Male 4	.47	.63	.46	.43	.66	.58	.71
Female 1	.41	.62	.52	.28	.54	.63	.45
Female 2	.37	.42	.42	.41	.66	.65	.66

the individual scales were not as homogenous as would be desired. That is, the scales did not apparently consistently measure the specific incentive systems solely. As Magnusson (1967) pointed out:

The more homogenous the items are, the greater the numerical value of K-R 20 will be for a given number of items in the test. The internal consistency coefficient we obtain from K-R 20 will therefore be directly dependent on the correlations between the items in the test, i.e., on the extent to which the items measure the same variable. (p. 117)

It was anticipated that the internal consistency of the scales may improve as a result of a rewriting of some items as well as the addition of new items. Revisions to items were determined by the item analysis which is presented next.

Item Analysis

Item analysis on all the scores of the items and incentive scales was the most important statistical analysis carried out with the set of pilot data. The Pearson product-moment correlation was the statistic utilized. The complete set of correlations may be found in Wood's (1976) dissertation proposal. All items for each group were assessed on the basis of three major steps.

Firstly, the intercorrelations of the scores of the incentive scales were examined. This was done to assess the relative independence of the scales. The scales had primarily low to moderate positive correlations with each other indicating a degree of independence of the scales. The majority of these correlations ranged from .01 to .38. However, for some of the six groups, the scale of esteem appeared to have higher than expected correlations with the scales of power, excellence, and aggression. These higher correlations

ranged from .47 to .56, .49 to .68, and .49 to .57 for the scale of esteem with power, excellence, and aggression respectively. This appeared to be also true for some of the six groups for the correlations between the scales of aggression and power. These higher correlations ranged from .48 to .54. The one expected result was the negative correlations between the independence and affiliation scales for each of the six groups (correlations ranged from $-.22$ to $-.38$).

Some of these intercorrelations were a strong indication that the individual items were not solely measuring one scale as was desired but rather an item designed to measure one scale was actually measuring aspects of several scales. In rewriting the items, an effort was made to remove that aspect of the item constructed to measure one specific scale which was felt to be causing the contaminations with the other scales.

An examination of the correlations of the scores of the individual items with the scores of each of the incentive scales indicated where the contaminations primarily existed. Thus, this was the second step in the examination of the item analysis. The items in each scale which correlated most highly with their own scale were identified. (Item scores were correlated with their own scale score with the score of that item included in the total scale score.) The highest positive correlations of the twelve items with their own scale would initially be considered the best items for that scale (Nunnally, 1970). These items could be assumed to be loading on the same scale.

An item's correlation with its own scale could only be evaluated in terms of its correlations with the other six scales. An item that correlated more highly with any of the other scales than it did with its own scale would naturally be considered a poor item in terms of measuring what it was designed to measure. By examining the correlations, it was possible to determine which items were potentially good items because of significantly higher correlations with their own scale score than with any of the other scale scores. By examining these correlations, the sources of contaminations of individual items of one scale with the other scales were also indicated. These were the major correlations that were examined in detail for the discarding and rewriting of the set of items.

The third and final step in the analysis of the items was to examine the intercorrelations between the scores of the twelve items themselves in each scale. These correlations were examined primarily to determine if there were extremely similar or redundant items. If high positive correlations appeared between the items then it was probable that the items were essentially redundant or too similar to each other to warrant the use of both. However, for the few negative correlations that occurred between items, it was assumed (albeit incorrectly) that they were measuring quite different concepts. A further examination of the correlations of these specific items with the other items of the scale was carried out to ascertain which of the items with negative correlations did not belong to the same scale.

Some of the items showed medium correlations with the other eleven items and might be interpreted as better items than others

which showed extremely low correlations with the other items.

Nunnally (1970) noted that "correlations between items on most tests are low in an absolute sense, with average correlations above .30 being the exception" (p. 550).

To summarize the steps of the item analysis, the following points are applicable. It should be noted that the sizes of the correlations for each of the steps in the item analysis were looked at from both absolute and relative viewpoints. That is, correlations were considered low, medium or high relative to other correlations in the analysis as well as from an absolute viewpoint. Each item was carefully examined on the basis of the steps previously outlined. In order for the item to be retained it had to correlate higher with its own scale than it did with any of the other scales; show low correlations with the other scales; and, finally, correlate medium highly with the other items for that scale. Such an item was considered to be measuring the incentive scale it was designed to measure. On this basis, 59 of the 84 items were extracted for the second version of the inventory and 25 were discarded. Of the 59 items, 52 were rewritten in an attempt to remove the specific words that appeared to be causing a relatively high correlation with other scales.

In summary, seven statements remained identical from the first to second form of the inventory; 52 of the items were retained, but in a rewritten version; and 11 new statements were added. The result was a total of 70 statements: 10 statements for each of the seven incentive scales.

A more complete breakdown by scale of the discarding and rewriting

of items, and the addition of new items is presented in Table 5.

Table 5
Breakdown by Scales of Revisions to Items for
the Revised Form of the Inventory

Scale	Discarded	Rewritten	No Change	New Item
Independence	2	10	0	0
Power	2	8	2	0
Affiliation	3	5	4	1
Arousal	5	6	1	3
Esteem	5	7	0	3
Excellence	5	7	0	3
Aggression	3	9	0	1
	25	52	7	11

Revised Form of the Inventory

As indicated previously, the revised form of the inventory consisted of 70 statements--10 statements for each of the seven incentive scales. Also, two of the scales, esteem and arousal, were relabelled success and stress respectively. Success was a more appropriate label for the incentive system being measured. Arousal as a system was too broad a construct to be successfully measured on a single scale. The construction of the stress scale measured more specific aspects of the arousal construct. The second

form of the inventory--THE ALBERTA IMI--was designed to yield a set of scores measuring the incentive motivation within seven major incentive systems of athletes. A description of this inventory can be found later in this chapter under the section entitled "The Instruments".

Summary of the Pilot Study

The progression of steps to develop an inventory to measure the construct of incentive motivation in sport was as follows:

1. Description of the scales to measure the construct.
2. Construction of the items to measure the specific scales.
3. Placement of the items into an inventory.
4. Administration of the inventory to samples of athletes.
5. Statistical analyses of the data obtained on the scales.
6. Revision of items for a second version of the inventory.

The next step which formed the basis for the present study was the administration of the IMI to a sample of athletes with the primary emphasis being on an examination of the construct validity of the IMI.

METHODS AND PROCEDURES IN THE PRESENT STUDY

Subjects and Sports

The subjects who took part in the present study were athletes participating in the sports of basketball and swimming. They ranged in age from 11 to 15 years. The basketball players were from male and female junior high school basketball teams from 10 junior high schools within the Edmonton Public School System (20 basketball teams in total). The swimmers were from five competitive swimming clubs in the city of Edmonton.

The number of subjects needed for this study was 400. Specifically, the subjects needed for this study were 200 competitive basketball players--100 of each sex and 200 competitive swimmers--100 of each sex. Fifty percent of the athletes tested from each of the four subgroups comprised the test-retest sample. The male and female basketball teams at five of the 10 junior high schools were selected for the test-retest sample. The test-retest sample for the male and female swimmers consisted of those swimmers from each club who returned for a second testing session.

In this study, a total of 460 athletes were tested. The discrepancy between the number of athletes needed and tested was due to the fact teams or groups of athletes were tested and not individual athletes. From the 10 male basketball teams tested, the number of players per team ranged from 9-15, and for the 10 female teams, the number ranged from 8-14. As one coach was

responsible for each team and as each team was tested in their own school during a regular basketball practice time, participation at the testing sessions by all players of each team was highly assured.

With the swimmers there was considerably less control over the number of athletes participating at one testing session. Although there was a head coach for each swim club, there were, as well, assistant coaches for each club. Thus, testing efforts had to be coordinated through the head coaches to the assistant coaches. As well, various groups in each club practiced at different locations and at different times. There was no strong assurance of the number of swimmers who would be at any particular testing session.

All athletes present at the testing sessions were permitted to participate in this study. This was done for two reasons. Firstly, the basketball players were tested as part of a particular basketball team, and the swimmers were tested as subgroups within a particular club, it would not have been a positive experience to single out for elimination from the study a few athletes from each of the teams or groups.

Secondly, it was felt that invalid and/or incomplete data may have been collected from some athletes. Such data would, of necessity, have to be eliminated from the study. To provide some assurances that there would be valid and complete data for at least the number of subjects needed (100 athletes of each sex and sport), the extra testing was acceptable. The complete breakdown of the number of male and female

athletes tested in the sports of basketball and swimming, and the rationale for those athletes deleted from the present study is provided in the Results and Discussion chapter (*infra*, p. 133).

Construct Validation of The Alberta IMI

Construct validity is traditionally considered the most important characteristic of a psychological inventory (APA et al., 1974; Cronbach, 1970; Lord and Novick, 1968; Nunnally, 1967). It is essential to be able to assign a degree of confidence in a scale score as a representation of a construct. In recent years there has been an increased awareness by assessment specialists that it is not only necessary to provide evidence that an inventory shows a positive correlation with variables with which it is supposed to correlate (convergent validity) but also to show relatively low correlations with theoretically distinct variables (discriminant validity) (Cronbach, 1970; Jackson, 1974; Kerlinger, 1973; Lord and Novick, 1968).

The present study used two major independent statistical methods to examine the construct validity of the IMI. The first statistical method utilized a multi-incentive³-multimethod matrix of intercorrelations that examined both convergent and discriminant validity. Campbell and Fiske (1959) are credited with the examination of construct validity via a multitrait-multimethod matrix of intercorrelations that represent at least two traits, each measured by at least

³To facilitate presentation in the explanation of this statistical method the term multi-incentive used throughout must be seen to include both the incentives of the IMI and the traits of the PRF-E (methods 1 and 2 respectively of Table 6).

two methods. The second statistical method involved principal-axis factoring, varimax rotation, and orthogonal procrustean transformation.

Table 6 illustrates the first major statistical method used in the validation process in the present study. This table shows each of the seven incentives measured by two different methods.

These two methods were:

- 1) The Alberta IMI--the inventory which is being validated;
and

- 2) Personality Research Form E (PRF-E)--an inventory of general personality traits which were felt to correspond to the specific incentives measured in sport by the IMI.

As well, the incentives were measured by two additional methods:

Behavior Rating of Athletes by Coaches--an inventory in which the coaches rated their respective athletes on the seven incentives;
and

Behavior Rating of Athletes by Athletes--an inventory in which the athletes rated each other on the seven incentives.


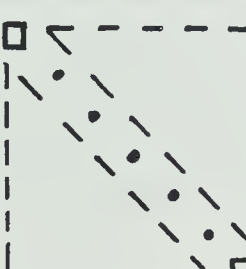

In the present study, only the results from the former two methods are reported. A more detailed description of these two inventories used in the present study is presented later in this chapter under the section entitled "The Instruments".

For the purpose of discussing Table 6, it is useful to utilize the labels for the various regions of the matrix as provided by



Campbell and Fiske (1959). The one point to note is that the word "trait" when used by Campbell and Fiske has been replaced here by the word "incentive" (supra, footnote 3, p. 120).

Table 6



Convergent and Discriminant Validation by a Multi-Incentive-Multimethod Matrix of Intercorrelations

		The Alberta IMI							Personality Research Form E						
		Method 1							Method 2						
Incentives		1	2	3	4	5	6	7	1	2	3	4	5	6	7
The Alberta IMI	1														
	2														
	3														
	4														
	5														
	6														
	7														
Personality Research Form E	1														
	2														
	3														
	4														
	5														
	6														
	7														

Note. Table 6 is adapted from Campbell and Fiske (1959:82).

Key: Validity Diagonals-- $\square \dots \square$
 Reliability Diagonals-- $() \dots ()$
 Heteroincentive-Monomethod Triangles-- 
 Heteroincentive-Heteromethod Triangles-- 

The reliability coefficients are labelled reliability diagonals-- one for each method. These coefficients could also be designated as

the monoincentive-monomethod values. The heteroincentive-monomethod triangle is adjacent to each reliability diagonal. This triangle and the adjacent reliability diagonal make up a monomethod block (). The validity coefficients are labelled validity diagonals. These coefficients could also be designated as heteroincentive-heteromethod values. This validity diagonal and the two heteroincentive-heteromethod triangles lying on each side of it make up a heteromethod block ().

According to Campbell and Fiske (1959), four aspects of the table are important for the validation process. First, for evidence of convergent validity the values in the validity diagonals should be significantly different from zero and sufficiently large to warrant further examination of validity.

The next three criteria are evidence for discriminant validity.

The second requirement Campbell and Fiske (1959) noted was that:

. . . a validity diagonal value should be higher than the values lying in its column and row in the hetero[incentive]-heteromethod triangles. That is, a validity value for a variable should be higher than the correlations obtained between that variable and any other variable having neither [incentive] nor method in common. (p. 82).

The third requirement is that:

. . . a variable correlate higher with an independent effort to measure the same [incentive] than with measures designed to get at different [incentives] which happen to employ the same methods. For a given variable, this involves comparing its values in the validity diagonals with its values in the hetero[incentive]-monomethod triangles. (Campbell and Fiske, 1959:83).

The fourth and final requirement is that the "same pattern of [incentive] interrelationship be shown in all of the hetero[incentive]

triangles of both the monomethod and heteromethod blocks" (Campbell and Fiske, 1959:83).

Reliability of The Alberta IMI

A necessary step in the evaluation of any inventory is the reliability of the measurement obtained (APA et al., 1974; Cronbach, 1970; Kerlinger, 1973; Magnusson, 1967; Nunnally, 1967, 1970). Jackson (1974) noted that "in evaluating an assessment technique, it is ordinarily considered essential to appraise the extent to which scores may be considered to be free from one or another type of measurement error and stable over time" (p. 20).

Jackson (1974) further noted that:

In psychological testing the concept of reliability has been used to refer to two distinct properties, the homogeneity or freedom from error and irrelevancy of test scores within a single administration of the test, and the stability of test scores over time. It is important to have both of these kinds of information in evaluating a test. (p. 20)

Two types of reliability coefficients were computed for the seven scales of the IMI. Cronbach's (1951) coefficient alpha (α) was computed as a measure of internal consistency and item homogeneity. Nunnally (1970) noted that coefficient alpha is the most generally useful equation for estimating reliability on the basis of internal consistency. Coefficient alpha provided a measure of inter-item similarity--that is, an estimate of the extent to which the items within a scale intercorrelated and thus the extent to which each scale was measuring a single variable (Brown, 1976). The stability over time of the scores of the IMI scales was determined

by test-retest reliability coefficients. The coefficient of stability provided a measure of the extent to which the incentives being measured were stable over time and thus the extent to which the scores could be generalized over time (Brown, 1976).

The Instruments

The Alberta IMI

The Alberta IMI is an inventory that was designed to measure and evaluate the structure of incentive motivation in competitive athletes. As was indicated previously, the inventory consisted of 70 statements--10 statements for each of the seven incentive scales. The ordering of the items in the inventory was designed to provide repeated measures of each of the seven scales in the following order: excellence, power, stress, independence, success, aggression, and affiliation. Thus, every seventh statement provided a measure of an aspect of one specific scale (e.g., statements 1, 8, 15, . . . 64 were designed to assess the incentive scale of excellence). It should be noted that the order of placement of the items in the inventory differed from that of the pilot study (supra, p. 107). This was done to provide for maximum separation of various scales (for example, independence and affiliation, excellence and success, power and aggression) that were felt to bear a relationship such that if placed close together they may have possibly contributed to a response bias.

A copy of the IMI can be found in Appendix A. Instructions for responding to the inventory were provided on the first page of the inventory. The athletes responded to each of the items on the basis

of a four choice continuum (always, often, seldom, and never). Using the IMI answer sheet (see Appendix A) one of these four responses was written for each of the 70 statements. It should also be noted that the response choices varied slightly from that of the pilot study (supra, p. 107). "Sometimes" as one of the choices was replaced by "often." It was felt that this change provided a better likelihood of response choices being interpreted as equally spaced along a continuum.

As in the pilot study, responses to the inventory were quantified on a 4-point scale. That is, scores of 4, 3, 2, and 1 were assigned respectively to the responses "always," "often," "seldom," and "never." There were no reverse items in this revised form of the inventory. The minimum score an individual could receive for each incentive scale was 10 while the maximum possible score was 40.

Two versions of the IMI were prepared. Statements are identical for both versions except specific words have been interchanged. This was done to make the statements more relevant and appropriate to the specific sports being studied. Words that have been interchanged are: "Playing" vs. "Performing," "Performance" vs. "Competing"; "Play" vs. "Perform"; and "Game" vs. "Meet" or "Competition." These differences applied to statements: 5, 15, 22, 24, 29, 33, 38, 40, 43, 45, 46, 59, 61, 65. As an example, statement 22 reads either as: 1) "Performing well is more important than winning." or 2) "Playing well is more important than winning." Version 1 of statement 22 was used when testing swimmers and version 2 when testing basketball players. It was felt that the interchange of

these words did not alter either the content or intent of the specific statements but rather made the statements more applicable to the particular sport. For example, "playing" for basketball players was assumed to be equivalent in meaning to "performing" for swimmers.

Personality Research Form E (PRF-E)

Wiggins (1973) noted that "the Personality Research Form (PRF) is unquestionably the best example of a large scale personality inventory developed under the construct point of view" (p. 409). The PRF measures 20 variables derived from Murray's (1938) system of needs as well as two control variables--infrequent responding and social desirability. The personality traits measured are relevant to the functioning of individuals in a wide variety of situations (Jackson, 1974).

The PRF is available in five formats. Forms A and B are parallel forms each containing 300 items comprised of fifteen 20-item scales. Forms AA and BB each consist of 440 items, including the same fifteen 20-item scales in Forms A and B in addition to another set of seven 20-item scales. Form E (the form of interest to the present study) is comprised of twenty-two 16-item scales for a total of 352 items. The initial item pool for developing the PRF-E consisted of the 880 items originally selected for PRF Forms AA and BB. These 880 items had been previously selected on substantive and statistical grounds from a pool of approximately 3000 items (Jackson, 1974).

Forms A, B, AA, and BB were designed for use with college populations. Form E of the PRF was developed for use with a wide variety

of populations, including junior and senior high school students, in sports and recreation, in vocational rehabilitation and job counseling with non-college populations, with the aged, with psychiatric populations, as well as with college populations. Form E has been successfully used with students as far down as grade 7 (Jackson, 1974).

The PRF manual (Jackson, 1974) reports on a number of reliability and validity studies with the various forms of the PRF. The internal consistency (odd-even and K-R 20) and test-retest reliability coefficients reported compare at least as favorably with that of other personality scales of equal length. Satisfactory evidence for convergent and discriminant validity was also reported.

All of the PRF dimensions of personality were conceived both theoretically and in terms of measurement to be bipolar. Thus, for every PRF scale half of the items were written in terms of one pole of the dimension and half in terms of the other. To each of the items subjects responded with either true or false depending on whether or not the item was descriptive of the subject. Responses which corresponded to the items being true-keyed and false-keyed were assigned a 1. Responses not given in the keyed direction were assigned a 0. The minimum score an individual could receive for each scale of the PRF-E was 0 while the maximum possible score was 16.

The specific scales of the PRF-E that corresponded most closely to the specific incentives measured in sport by the IMI were as follows:

<u>PRF-E Scales</u>	<u>IMI Scales</u>
Achievement	Excellence
Affiliation	Affiliation
Aggression	Aggression
Autonomy	Independence
Dominance	Power
Social Recognition	Success
Change ⁴	Stress

In addition to these seven scales, two other scales from the PRF-E were also used. These two scales were the two validity scales--infrequency and desirability scales. The infrequency scale measured the tendency of an individual to respond in an implausible manner possibly because of carelessness, poor comprehension, confusion, or the individual did not want to complete the inventory. An individual who scores high on this scale for any reason other than non-purposeful or random responding (or errors in scoring) is highly unlikely. Jackson (1974) recommended that serious consideration be given to the possibility of errors in responding or in scoring if an individual attains a raw score of 4 or more on the infrequency scale.

The desirability scale measured the tendency of the individual to describe oneself in terms judged as desirable. A higher than average score on this scale indicates that the subject either consciously or unconsciously focused on the desirability of the items. High scores may indicate either conscious distortion or impression

⁴The change scale dealt primarily with novelty. Thus, this scale corresponded to only one component of the stress system.

management or atypically high self-regard or a high degree of conventional socialization. Very low scores may indicate tendencies toward malingering or atypically low self-regard. The average subject usually responds in a desirable rather than undesirable direction (Jackson, 1974).

These nine scales of the PRF-E were presented in a 144-item inventory. The order of the items of these nine scales was identical to the order found in the complete twenty-two 16-item scales.

Protocol for Administration of the Instruments

All of the testing for the present study was carried out during the months of November, 1976 to June, 1977. Testing was carried out in supervised group settings at the appropriate Junior High Schools and Swim Clubs. Although the size of the groups tested at any one time varied, the majority of the testing was carried out in groups of approximately 10-20 athletes.

A brief explanation of the purpose of the study was given. Subjects were then instructed to provide personal demographic data on the first inventory answer sheet. Prior to each inventory being completed, all subjects were asked to read the instructions on the first page. Following this, the instructions for completing the particular inventory were explained and any questions were answered to ensure the subjects understood what was required.

All athletes completed first The Alberta IMI followed by the Personality Research Form E. The majority of athletes tested completed

the necessary inventories in approximately 90⁵ minutes. A five-minute break was given between the completion of each inventory. It was emphasized to concentrate only on the inventory being completed at that time and to forget about the inventory that they may have just completed or may have left to do. While the athletes were completing the inventories, the coaches completed the appropriate behavior rating inventory provided for their use (Behavior Rating of Athletes by Coaches).

Those athletes forming the retest sample, as well as all of the coaches, completed the appropriate inventories for a second time following a time interval of not less than two weeks and not greater than three weeks.

Experimental Design of the Sub-Problem

The experimental design for the investigation of the sub-problem was a 2 x 2 factorial experiment. The two independent factors were sex and sport. Each independent factor had two levels. The two levels of the factor sport were basketball and swimming. The dependent variables were the seven incentive scales of the IMI: excellence, power, stress, independence, success, aggression, and affiliation.

⁵The time duration resulted from the athletes completing the Behavior Rating of Athletes by Athletes inventory (supra, p. 121) as well as the IMI and the PRF-E. The majority of athletes completed the IMI and the PRF-E in approximately 60 minutes.

Statistical Treatment of the Data

The main problem of the study--the assessment of the construct validity of the IMI--was examined using two major statistical analyses. As previously outlined, the first statistical method utilized a multi-incentive-multimethod matrix of Pearson product-moment intercorrelations. The second method utilized principal-axis factoring, varimax rotation, and orthogonal procrustean transformation.

As previously noted, coefficient alpha (α) was computed as a measure of internal consistency of the scales of the IMI. Pearson product-moment correlations were computed for the test-retest coefficients of the scales of the IMI.

The sub-problem of the study was examined using two-way analysis of variance (2-way ANOVA) on each of the IMI subtests. Scheffé contrasts of the subgroups whenever significant interactions resulted were also used. As well, the sub-problem was examined using a two-way multivariate analysis of variance (2-way MANOVA) and multiple comparisons on the IMI subtests were carried out when significant factors resulted from this analysis.

Chapter IV

RESULTS AND DISCUSSION

Subjects and Sports

A breakdown by sport, age, and sex of the 460 athletes tested is provided in Table 7. A total of 400 athletes comprised the sample used in the present study--100 athletes from each of the sports of basketball and swimming and of each sex.

Table 7

Distribution by Age, Sex, and Sport of Athletes Tested

Age (Years)	Number of Athletes Tested			
	Male Basket- ball Players	Female Basket- ball Players	Male Swimmers	Female Swimmers
11	1	0	24 (5)	31 (4)
12	6	5	20 (6)	33 (5)
13	17 (2)	27 (5)	26 (2)	21 (4)
14	59 (11)	55 (6)	18 (1)	11
15	17	13 (3)	12	4 (1)
Total n = 400 (60)	100 (16 ^a)	100 (14)	100 (16 ^a)	100 (14)

Note. Numbers in parenthesis indicate those athletes deleted from the present study.

^aIt was decided a priori to use only subjects in the age range of 11-15 years. Three male basketball players and two male swimmers were deleted because they were 16 years old. This accounts for the discrepancy of the deleted totals for these two subgroups.

As can be seen from Table 7, 16 athletes were deleted from each of the subgroups of male basketball players and male swimmers and 14 athletes were deleted from each of the subgroups of female basketball players and female swimmers. Subjects were deleted for a number of reasons. Any subject who scored 4 or greater on the Infrequency Scale of the PRF-E was deleted from the study. This accounted for 14 subjects being deleted. Any subject who had incomplete data was also deleted from the study. This accounted for a further 27 subjects being deleted from the study. Incomplete data resulted for a variety of reasons. Six basketball players from the retest sample were no longer on the team when the retest session was carried out. Seven subjects did not complete all necessary inventories--in particular, the PRF-E and Behavior Rating of Athletes by Athletes. One basketball player had just joined the team and thus completing the Behavior Rating of Athletes by Athletes was not possible.

As it was not possible to control which athletes each swimmer rated, some swimmers had incomplete data ($n = 13$) because they were either not rated by their peers or were only rated by one other swimmer. Also, one of these swimmers could not be rated on a retest because the subjects rating the swimmer during the first testing session did not attend the retest session.

Six subjects were eliminated based on the testing sessions in which the researcher was concerned about the seriousness and honesty of these subjects completing the inventories. And finally, the remaining nine subjects were deleted because there was more

than the desired number of subjects left in three of the subgroups and all of the above had already been considered. Six of these subjects were then deleted on the basis of scoring 3 on the Infrequency Scale of the PRF-E and three subjects were randomly deleted from the sample.

Of the 400 athletes used in the present study, 200 of them comprised the test-retest sample. These 200 subjects consisted of 50 athletes from each of the sports of basketball and swimming and of each sex. A more complete breakdown by sport, age, and sex of those athletes who were tested only once on all inventories and those athletes who comprised the test-retest sample is presented in Table 8.

Although the ages of the subjects were from 11 to 15 years, as can be seen from Tables 7 and 8 the largest percentage of the basketball players were in the upper ages (14-15) while the largest percentage of the swimmers were in the lower ages (11-13). Approximately 72% of the basketball players were 14 years of age and older. This was consistent with most junior high school basketball teams being comprised of the upper grade (i.e., grade 9) of junior high students. Competitive swimming clubs attract children at very young ages with approximately 75% of the members of any swimming club being 13 years of age or younger (Hogg, 1978). This was consistent with the swimmers in the present study where approximately 78% were 13 years of age or younger.

Table 8

Distribution by Age, Sex, and Sport of Athletes Tested Once
and Athletes Tested on a Test-Retest

Age (Years)	Number of Athletes Tested							
	Male Basketball Players		Female Basket- ball Players		Male Swimmers		Female Swimmers	
	One Test	Test- Retest	One Test	Test- Retest	One Test	Test- Retest	One Test	Test- Retest
11	1	0	0	0	9	15(5)	14(2)	17(2)
12	6	0	4	1	11(5)	9(1)	19	14(5)
13	10(1)	7(1)	11(2)	16(3)	17(2)	9	10(2)	11(2)
14	27(9)	32(2)	29(1)	26(5)	5	13(1)	5	6
15	6	11	6(1)	7(2)	8	4	2(1)	2
Total n=400(60)	50(11 ^a)	50(5 ^a)	50(4)	50(10)	50(8 ^a)	50(8 ^a)	50(5)	50(9)
	100(16)		100(14)		100(16)		100(14)	

Note. Numbers in parenthesis indicate those athletes deleted from the present study.

^aDiscrepancy in deleted totals explained by specific note "a" in Table 7 (supra, p. 133).

Construct Validity of The Alberta IMI

A desirable outcome of this study was to develop one inventory that measured sport-specific constructs that could be used for all sports and would be able to discriminate (where appropriate) between sports and sexes and within sports between sexes. For this reason, the emphasis on the results are with all subjects as one large

group (n = 400) and are broken down into subgroups as appropriate for making comparisons of the subgroups to the total group and for examining group differences. As previously indicated, the four subgroups used in the present study were: male basketball players, female basketball players, male swimmers, and female swimmers.

As previously indicated, two major independent statistical methods were used to examine the construct validity of the IMI. These two methods were: 1) correlational method as outlined by Campbell and Fiske (1959), and 2) principal-axis factoring, varimax rotation and orthogonal procrustean transformation.

Evaluation of Construct Validity of the IMI by Campbell and Fiske Criteria

The criteria necessary for the examination of construct validity (convergent and discriminant validity) via a multi-incentive-multimethod matrix of intercorrelations were presented in the Methods and Procedures Chapter (supra, p. 123).

The first criterion provided evidence for convergent validity. This criterion stated that the validity coefficients for the seven incentive scales of the IMI be significantly different from zero and sufficiently large to warrant further examination of validity. Table 9 provides the validity coefficients for the IMI scales with the respective PRF-E scales for all subjects. The respective lower and upper limits for the validity coefficients at the .95 confidence level and the respective correlations corrected for attenuation are also given.

Table 9

Validity Coefficients of the Seven IMI Scales with Respective
PRF-E Scales for All Subjects (n = 400)

Scale IMI PRF-E	Validity Coefficient r_{xy}	Correction for Attenuation ($r_{xy} \text{ Cor}$)	Lower Limit for r_{xy}	Upper Limit for r_{xy}
1 <u>Excellence</u> <u>Achievement</u>	.243*	.351	.149	.333
2 <u>Power</u> <u>Dominance</u>	.442*	.625	.359	.518
3 <u>Stress</u> <u>Change</u>	.229*	.374	.134	.320
4 <u>Independence</u> <u>Autonomy</u>	.232*	.336	.137	.323
5 <u>Success</u> <u>Social Recognition</u>	.234*	.344	.139	.325
6 <u>Aggression</u> <u>Aggression</u>	.395*	.514	.309	.474
7 <u>Affiliation</u> <u>Affiliation</u>	.305*	.457	.214	.391

* Significant at the .05 level.

The correlations in Table 9 were all significantly different from zero, thereby supporting the convergent validity of the IMI. Because the correlations were between the situation-specific IMI scales and the respective non-specific PRF-E scales, the low to moderate positive correlations were expected. The IMI is a sport-specific inventory designed to measure seven specific incentives in sport situations. The PRF-E was designed to measure general traits relevant to a wide variety of situations. The PRF-E scales listed in Table 9 were those that were felt to correspond most closely to the respective sport-specific incentives of the IMI. The lowest validity correlation coefficient was the stress scale of IMI with the change scale of the PRF-E. However, this was also expected as the change scale deals primarily with novelty and as such corresponds to only one component of the stress system.

If high correlations had resulted between the IMI and PRF-E scales then that would have suggested that the IMI was measuring the same constructs as the PRF-E scales (i.e., the sport-specific inventory was no different than the general inventory) and thus the IMI would have no unique purpose. Conversely, correlations near zero between the IMI and PRF-E scales would have suggested that the sport-specific constructs measured by the IMI had no relationship to the general constructs measured by the PRF-E. This would have also placed doubt on the validity of the IMI scales.

Tables 10, 11, 12, and 13 respectively provide the validity coefficients for the seven scales of the IMI with the respective PRF-E scales for the four subgroups of athletes--male basketball

Table 10

Validity Coefficients of the Seven IMI Scales with Respective
PRF-E Scales for Male Basketball Players

Scale IMI PRF-E	Validity Coefficient r_{xy}	Correction for Attenuation ($r_{xy} \text{ Cor}$)	Lower Limit for r_{xy}	Upper Limit for r_{xy}
1 <u>Excellence</u> Achievement	.190	.297	-.006	.373
2 <u>Power</u> Dominance	.382*	.610	.200	.538
3 <u>Stress</u> Change	.128	.202	-.070	.317
4 <u>Independence</u> Autonomy	.299*	.309	.034	.407
5 <u>Success</u> Social Recognition	.314*	.445	.125	.481
6 <u>Aggression</u> Aggression	.376*	.570	.193	.533
7 <u>Affiliation</u> Affiliation	.282*	.457	.091	.453

* Significant at the 0.05 level.

Table 11

Validity Coefficients of the Seven IMI Scales with Respective
PRF-E Scales for Female Basketball Players

Scale IMI PRF-E	Validity Coefficient r_{xy}	Correction for Attenuation ($r_{xy} \text{ Cor}$)	Lower Limit for r_{xy}	Upper Limit for r_{xy}
1 <u>Excellence</u> <u>Achievement</u>	.313*	.491	.124	.480
2 <u>Power</u> <u>Dominance</u>	.408*	.534	.230	.559
3 <u>Stress</u> <u>Change</u>	.408*	.735	.230	.559
4 <u>Independence</u> <u>Autonomy</u>	.050	.081	-.148	.244
5 <u>Success</u> <u>Social Recognition</u>	.217*	.419	.021	.397
6 <u>Aggression</u> <u>Aggression</u>	.315*	.371	.126	.482
7 <u>Affiliation</u> <u>Affiliation</u>	.184	.279	-.013	.367

* Significant at 0.05 level.

Table 12

Validity Coefficients of the Seven IMI Scales with Respective
PRF-E Scales for Male Swimmers

Scale IMI PRF-E	Validity Coefficient r_{xy}	Correction for Attenuation ($r_{xy} \text{ Cor}$)	Lower Limit for r_{xy}	Upper Limit for r_{xy}
1 <u>Excellence</u> Achievement	.314*	.460	.125	.481
2 <u>Power</u> Dominance	.438*	.724	.253	.576
3 <u>Stress</u> Change	.221*	.414	.026	.400
4 <u>Independence</u> Autonomy	.302*	.484	.113	.471
5 <u>Success</u> Social Recognition	.078	.127	-.120	.270
6 <u>Aggression</u> Aggression	.410*	.542	.233	.562
7 <u>Affiliation</u> Affiliation	.317*	.481	.128	.483

* Significant at 0.05 level.

Table 13

Validity Coefficients of the Seven IMI Scales with Respective
PRF-E Scales for Female Swimmers

Scale IMI PRF-E	Validity Coefficient r_{xy}	Correction for Attenuation ($r_{xy} \text{ Cor}$)	Lower Limit for r_{xy}	Upper Limit for r_{xy}
1 <u>Excellence</u> Achievement	.201*	.279	.005	.383
2 <u>Power</u> Dominance	.450*	.583	.278	.594
3 <u>Stress</u> Change	.238*	.367	.044	.415
4 <u>Independence</u> Autonomy	.324*	.443	.136	.489
5 <u>Success</u> Social Recognition	.284*	.351	.093	.455
6 <u>Aggression</u> Aggression	.240*	.346	.046	.417
7 <u>Affiliation</u> Affiliation	.409*	.591	.231	.560

* Significant at the 0.05 level.

players, female basketball players, male swimmers, and female swimmers. The lower and upper limits for the validity coefficients at the .95 confidence level and the respective correlations corrected for attenuation are also given.

Because the validity coefficients for three (male basketball players, female basketball players, male swimmers) of the four subgroups were not all significantly different from zero, the convergent validity of all scales did not receive strong support for these subgroups. For female swimmers, the correlations were all significantly greater than zero. The validity coefficients for five out of the seven scales for male basketball players and female basketball players, and for six out of the seven scales for male swimmers were significantly different from zero. The correlations reported for all of the validity coefficients significantly different from zero were in the expected range--low to moderate. As can be seen from Table 10, the validity coefficients for the scales of stress and excellence for male basketball players were not significantly different from zero. Table 11 shows that the validity coefficients for the scales of independence and affiliation for female basketball players were not significantly different from zero. As can be seen from Table 12, the validity coefficient for the success scale for male swimmers was the one correlation that was not significantly different from zero.

Based on the results presented in Tables 9 to 13, the following scales for all subjects and for each of the four subgroups of athletes met the strict requirements of criterion 1 and, thus, would be retained for examination via criterion 2:

<u>Group</u>	<u>Scales Satisfying Criterion 1</u>
All subjects	All
Male Basketball Players	All except Excellence and Stress
Female Basketball Players	All except Independence and Affiliation
Male Swimmers	All except Success
Female Swimmers	All

However, it seemed reasonable to retain all scales for further examination since few of the doubtful scales were far from significance. Elimination of entire scales or parts thereof was only done after all the data had been examined via the four criteria.

The second criterion was the first of three criteria that were used to provide evidence for discriminant validity. The second criterion stated that a validity coefficient for any incentive scale of the IMI should be higher than the correlations obtained between that scale and any of the other scales measured by different methods.

The number of times the convergent validity coefficients for the seven incentive scales were greater than the respective heteroincentive-heteromethod correlations was determined. The results in the form of frequency and corresponding percentage are presented in Table 14 for the group of all subjects. A copy of the heteroincentive-heteromethod correlations of the IMI scales with the PRF-E scales for all subjects can be found in Appendix B (Table 46). The criterion percentage for the validity coefficients exceeding the respective correlations was arbitrarily taken as 75% or greater. However, in actuality this percentage could never be less than 83.33%. As is evident from Table 14, all percentages for the validity coefficients

were acceptable and thus criterion 2 was satisfied for the validity coefficients of all seven scales. All of these validity coefficients had also satisfied criterion 1.

Table 14

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Heteromethod Correlations
for All Subjects

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >^a$		$r_{xy} <^b$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	6/6	100.00	0/6	0.00
2 Power	6/6	100.00	0/6	0.00
3 Stress	6/6	100.00	0/6	0.00
4 Independence	6/6	100.00	0/6	0.00
5 Success	5/6	83.33	1/6	16.67
6 Aggression	6/6	100.00	0/6	0.00
7 Affiliation	6/6	100.00	0/6	0.00

$>^a$ --denotes greater than

$<^b$ --denotes less than

Tables 15, 16, 17, and 18 provide similar information for the four subgroups of athletes--male basketball players, female basketball players, male swimmers, and female swimmers respectively--as did Table 14 for all subjects. A copy of the heteroincentive-heteromethod correlations of the IMI scales with the PRF-E scales for the four subgroups of athletes can be found in Appendix B (Tables 47, 48, 49, and 50 respectively).

Table 15

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Heteromethod Correlations
for Male Basketball Players

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	5/6	83.33	1/6	16.67
2 Power	6/6	100.00	0/6	0.00
3 Stress	4/6	66.67	2/6	33.33
4 Independence	5/6	83.33	1/6	16.67
5 Success	5/6	83.33	1/6	16.67
6 Aggression	6/6	100.00	0/6	0.00
7 Affiliation	6/6	100.00	0/6	0.00

Table 16

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Heteromethod Correlations
for Female Basketball Players

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	6/6	100.00	0/6	0.00
2 Power	6/6	100.00	0/6	0.00
3 Stress	6/6	100.00	0/6	0.00
4 Independence	1/6	16.67	5/6	83.33
5 Success	6/6	100.00	0/6	0.00
6 Aggression	6/6	100.00	0/6	0.00
7 Affiliation	5/6	83.33	1/6	16.67

Table 17

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Heteromethod Correlations
for Male Swimmers

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	6/6	100.00	0/6	0.00
2 Power	6/6	100.00	0/6	0.00
3 Stress	6/6	100.00	0/6	0.00
4 Independence	6/6	100.00	0/6	0.00
5 Success	2/6	33.33	4/6	66.67
6 Aggression	6/6	100.00	0/6	0.00
7 Affiliation	6/6	100.00	0/6	0.00

Table 18

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Heteromethod Correlations
for Female Swimmers

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	4/6	66.67	2/6	33.33
2 Power	6/6	100.00	0/6	0.00
3 Stress	4/6	66.67	2/6	33.33
4 Independence	6/6	100.00	0/6	0.00
5 Success	6/6	100.00	0/6	0.00
6 Aggression	6/6	100.00	0/6	0.00
7 Affiliation	6/6	100.00	0/6	0.00

As all of the validity coefficients for the four subgroups did not exceed the comparison correlations at least 75% of the time, the discriminant validity of the IMI was called into question. As can be seen from Table 15, criterion 2 was satisfied for all validity coefficients except the stress scale for male basketball players. However, the validity coefficient for the stress scale was one of the two coefficients that did not satisfy criterion 1 either. For female basketball players, the validity coefficient for the independence scale was the only coefficient that did not satisfy this discriminant validity criterion (see Table 16). However, this validity coefficient was one of the two coefficients that did not satisfy criterion 1 either. Table 17 shows that for male swimmers the validity coefficient for the success scale did not satisfy criterion 2 nor had it satisfied criterion 1. As can be seen from Table 18, this discriminant validity criterion was not satisfied for the validity coefficients for the scales of excellence and stress for female swimmers. Although the validity coefficients for these two scales were the lowest ones for this subgroup, they had satisfied criterion 1.

Based on the results presented in Tables 14 to 18, the following scales for all subjects and for each of the four subgroups of athletes met the strict requirements for criterion 2:

<u>Group</u>	<u>Scales Satisfying Criterion 2</u>
All Subjects	All
Male Basketball Players	All except Stress
Female Basketball Players	All except Independence
Male Swimmers	All except Success
Female Swimmers	All except Excellence and Stress

The scales named above which met the requirements of criterion 2 were very similar to those that had met the requirements of criterion 1. For all subjects and for male swimmers, the respective results from criterion 1 and criterion 2 were identical, while for the other three subgroups the respective results from criterion 1 and criterion 2 were very similar with a few exceptions. One begins to suspect the validity of those scales that did not meet the requirements of either criterion 1 or criterion 2. These scales were: stress, independence, and success for the subgroups of male basketball players, female basketball players, and male swimmers respectively.

To meet the third criterion (the second of three criteria to examine discriminant validity) a validity coefficient for any incentive scale of the IMI should be higher than the correlations obtained between that scale and any of the other scales measured by the same method. The number of times the convergent validity coefficients for the seven incentive scales were greater than the respective heteroincentive-monomethod correlations was determined. Table 19 provides these results in the form of frequency and corresponding percentage for the group of all subjects. The heteroincentive-monomethod correlations of the IMI scales computed with an n of 400 subjects can be found in Appendix B (Table 46).

As with criterion 2, 75% or greater was taken as the criterion percentage. As is evident from Table 19, the percentages for three of the seven scales were acceptable. For four of the scales the validity coefficients did not exceed the comparison correlations at least 75% of the time and thus for these four scales--independence,

success, aggression, and affiliation--the discriminant validity was cast in doubt. For these four scales the validity coefficients exceeded the comparison correlations 66.67% of the time. The three scales whose validity coefficients had satisfied criterion 3 were excellence, power, and stress. The validity coefficients for all seven scales had satisfied both criterion 1 and criterion 2.

Table 19
Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Monomethod Correlations
for All Subjects

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	5/6	83.33	1/6	16.67
2 Power	6/6	100.00	0/6	0.00
3 Stress	5/6	83.33	1/6	16.67
4 Independence	4/6	66.67	2/6	33.33
5 Success	4/6	66.67	2/6	33.33
6 Aggression	4/6	66.67	2/6	33.33
7 Affiliation	4/6	66.67	2/6	33.33

Tables 20, 21, 22, and 23 provide similar information for the four subgroups of athletes--male basketball players, female basketball players, male swimmers, and female swimmers respectively--as did Table 19 for all subjects. The heteroincentive-monomethod correlations of the IMI scales for the four subgroups can be found in Appendix B (Tables 47, 48, 49, and 50 respectively).

Table 20

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Monomethod Correlations
for Male Basketball Players

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	4/6	66.67	2/6	33.33
2 Power	6/6	100.00	0/6	0.00
3 Stress	3/6	50.00	3/6	50.00
4 Independence	5/6	83.33	1/6	16.67
5 Success	4/6	66.67	2/6	33.33
6 Aggression	5/6	83.33	1/6	16.67
7 Affiliation	5/6	83.33	1/6	16.67

Table 21

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Monomethod Correlations
for Female Basketball Players

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	6/6	100.00	0/6	0.00
2 Power	5/6	83.33	1/6	16.67
3 Stress	6/6	100.00	0/6	0.00
4 Independence	1/6	16.67	5/6	83.33
5 Success	4/6	66.67	2/6	33.33
6 Aggression	4/6	66.67	2/6	33.33
7 Affiliation	3/6	50.00	3/6	50.00

Table 22

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Monomethod Correlations
for Male Swimmers

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	6/6	100.00	0/6	0.00
2 Power	6/6	100.00	0/6	0.00
3 Stress	5/6	83.33	1/6	16.67
4 Independence	5/6	83.33	1/6	16.67
5 Success	2/6	33.33	4/6	66.67
6 Aggression	5/6	83.33	1/6	16.67
7 Affiliation	6/6	100.00	0/6	0.00

Table 23

Incidence of Validity Coefficients (IMI with PRF-E)
Being Greater Than and Less Than Respective
Heteroincentive-Monomethod Correlations
for Female Swimmers

Scale	Validity Coefficient (r_{xy})			
	$r_{xy} >$		$r_{xy} <$	
	Frequency	Percentage	Frequency	Percentage
1 Excellence	2/6	33.33	4/6	66.67
2 Power	6/6	100.00	0/6	0.00
3 Stress	4/6	66.67	2/6	33.33
4 Independence	5/6	83.33	1/6	16.67
5 Success	4/6	66.67	2/6	33.33
6 Aggression	4/6	66.67	2/6	33.33
7 Affiliation	5/6	83.33	1/6	16.67

Criterion 3 was not met for these four subgroups as all of the validity coefficients for the four subgroups did not exceed the comparison correlations at least 75% of the time. Table 20 shows that the validity coefficients for the scales of excellence, stress, and success for male basketball players did not satisfy criterion 3. Two of these coefficients (excellence and stress scales) had not satisfied criterion 1 either. Neither had the coefficient for the stress scale satisfied criterion 2. The validity coefficient for the success scale had met the requirements for retainment via criterion 1 and criterion 2. As can be seen from Table 21 the validity coefficients for the scales of independence, success, aggression, and affiliation for female basketball players did not exceed the comparison correlations at least 75% of the time. Neither had the validity coefficients for these four scales for all subjects satisfied criterion 3. Of these four validity coefficients, only the coefficient for the independence scale had not met the requirements for criterion 1 and criterion 2, and the coefficient for the affiliation scale had not satisfied criterion 1.

Table 22 shows that the validity coefficients for all scales except success for male swimmers had met the requirements for criterion 3. The validity coefficient for the success scale had also not satisfied either criterion 1 or criterion 2. For female swimmers, the validity coefficients for the scales of excellence, stress, success, and aggression did not exceed the comparison correlations at least 75% of the time and thus did not satisfy the requirements for criterion 3 (see Table 23). These validity coefficients

had satisfied criterion 1 and only the validity coefficients for the scales of excellence and stress had not satisfied criterion 2.

Based on the results presented in Tables 19 to 23, the following scales for all subjects and for each of the four subgroups met the strict requirements for criterion 3:

<u>Group</u>	<u>Scales Satisfying Criterion 3</u>
All Subjects	All except Independence, Success, Aggression and Affiliation
Male Basketball Players	All except Excellence, Stress, and Success
Female Basketball Players	All except Independence, Success, Aggression and Affiliation
Male Swimmers	All except Success
Female Swimmers	All except Excellence, Stress, Success, and Aggression

The fourth and final criterion for the examination of construct validity was the third of three criteria to provide evidence for discriminant validity. For the fourth criterion, the same pattern of intercorrelations between the seven incentive scales of the IMI should exist for both similar and dissimilar methods of measurement. Tables 46, 47, 48, 49, and 50 in Appendix B show the intercorrelations of the IMI and PRF-E scales for the group of all subjects and the subgroups of male basketball players, female basketball players, male swimmers, and female swimmers respectively.

A correlation of at least $|.3|$ was needed for any of the scales to be considered as being intercorrelated. Table 24 presents a summary of the IMI scales whose intercorrelations in the heteroincentive-monomethod triangle and the corresponding heteroincentive-heteromethod

triangles were $|.3|$ or greater for the group of all subjects and for each of the four subgroups of athletes. The criterion percentage for the same pattern of intercorrelations being shown between the IMI scales in both the heteroincentive-monomethod triangle and the corresponding heteroincentive-heteromethod triangles was taken as 75% or greater. However, because there were six correlations for each IMI scale in the heteroincentive-monomethod triangle that were compared to their parallel values in the corresponding heteroincentive-heteromethod triangles this criterion percentage could never actually be less than 83.33%.

Similar results were reported for the group of all subjects and for each of the four subgroups. Although several of the scales of the IMI were intercorrelated (heteroincentive-monomethod triangles), the majority of correlations in the heteroincentive-heteromethod triangles indicated that the scales were relatively independent of each other. Although one desired relatively independent scales, the majority of the intercorrelations reported in the heteroincentive-monomethod triangles were acceptable.

For the groups examined, the differences in the levels of correlations between the scales of the heteroincentive-monomethod triangle listed in Table 24 and their parallel values in the corresponding heteroincentive-heteromethod triangles indicated the extent of method variance present. Any difference equal to or greater than $|.15|$ was interpreted as providing evidence for method variance.

Table 24

Scales of the IMI Whose Intercorrelations were $|\cdot 3|$ or
Greater in the Heteroincentive-Monomethod Triangle
and the Corresponding Heteroincentive-
Heteromethod Triangles

Group	Heteroincentive-Monomethod Triangle	Heteroincentive-Heteromethod Triangles
All Subjects	Scale 1 with 7 Scale 2 with 5 and 6 Scale 4 with 7 (negative) Scale 5 with 6	---
Male Basketball Players	Scale 2 with 5 and 6 Scale 4 with 7 (negative) Scale 5 with 6	Scale 4 (IMI) with 7 (PRF-E) (negative) Scale 5 (IMI) with 2 (PRF-E)
Female Basketball Players	Scale 2 with 5 and 6 Scale 3 with 7 Scale 5 with 6	---
Male Swimmers	Scale 1 with 7 Scale 6 with 2, 4, and 5	Scale 6 (IMI) with 1 (PRF-E) (negative) Scale 7 (IMI) with 4 (PRF-E) (negative)
Female Swimmers	Scale 1 with 4 (negative) and 7 Scale 2 with 3 and 5 Scale 3 with 7 Scale 4 with 7 (negative) Scale 5 with 6	Scale 1 (IMI) with 7 (PRF-E) Scale 3 (IMI) with 1 (PRF-E)

Note. Scales of IMI: 1--Excellence, 2--Power, 3--Stress,
4--Independence, 5--Success, 6--Aggression,
and 7--Affiliation.
Scales of PRF-E: 1--Achievement, 2--Dominance, 4--Autonomy,
and 7--Affiliation.

From the scale intercorrelations of the heteroincentive-monomethod triangles listed in Table 24, only some of these IMI scales did not demonstrate the same pattern of intercorrelations, in both the heteroincentive-monomethod triangle and the corresponding heteroincentive-heteromethod triangles, 100% of the time. However, to satisfy criterion 4, these scales only had to meet the criterion at least 75% of the time. Thus, for example, for the group of all subjects, only one correlation of the six correlations of the excellence scale of the IMI with the other IMI scales and corresponding PRF-E scales had not satisfied criterion 4 (excellence scale with affiliation scale of IMI) but this scale had still satisfied criterion 4 83.33% of the time.

Those scales of the IMI that did not satisfy criterion 4 and indicated method variance were: 1) for the group of all subjects the scales of power and aggression, and for the subgroup of male basketball players the scale of power; 2) for the subgroup of female basketball players the scales of success and aggression and for the subgroup of male swimmers the scale of aggression; and 3) for the subgroup of female swimmers the scales of success and affiliation. Thus the discriminant validity for three of the seven IMI scales was supported for all groups as evaluated by criterion 4.

In summary, the following scales for all subjects and for each of the four subgroups met the strict requirements for criterion 4:

<u>Group</u>	<u>Scales Satisfying Criterion 4</u>
All Subjects	All except Power and Aggression
Male Basketball Players	All except Power

<u>Group</u>	<u>Scales Satisfying Criterion 4</u>
Female Basketball Players	All except Success and Aggression
Male Swimmers	All except Aggression
Female Swimmers	All except Success and Affiliation

It will be recalled that a desirable outcome of this study was to develop one inventory that measured sport-specific constructs as defined by the scales of the IMI that could be appropriately used in all sports. The results were encouraging based on the evaluations with respect to the first two criteria and criterion 4, but the results were not nearly as positive based on the evaluations with respect to criterion 3.

Table 25 presents a summary of the IMI scales that did not satisfy the requirements with respect to criteria 1, 2, 3, and 4 for the group of all subjects and for each of the four subgroups of athletes.

Table 25

IMI Scales Not Satisfying the Requirements of
the Respective Criteria 1, 2, 3, and 4

Group	Criteria			
	1	2	3	4
All Subjects	---	---	Independence Success Aggression Affiliation	Power Aggression
Male Basketball Players	Excellence Stress	Stress	Excellence Stress Success	Power

Table 25 (continued)

Group	Criteria			
	1	2	3	4
Female Basketball Players	Independence Affiliation	Independence	Independence Success Aggression Affiliation	Success Aggression
Male Swimmers	Success	Success	Success	Aggression
Female Swimmers	---	Excellence Stress	Excellence Stress Success Aggression	Success Affiliation

As is evident from Table 25 the evidence for convergent validity of the scales of the IMI with respect to criterion 1 was good. The validity coefficients for the scales of power and aggression had satisfied the requirements of criterion 1 for all groups. The validity coefficients for the remaining five scales--excellence, stress, independence, success, and affiliation--provided evidence for convergent validity for four of the five groups.

Criteria 2, 3, and 4 provided evidence for discriminant validity of the IMI scales. The evidence for discriminant validity via criterion 2 was good. The validity coefficients for the scales of power, aggression, and affiliation provided evidence for discriminant validity for all groups. For four of the five groups the validity coefficients for the scales of independence, excellence, and success provided evidence for discriminant validity. The validity coefficient

for the remaining scale of stress had satisfied the requirements for criterion 2 for three of the groups.

The results of the evaluations with respect to criterion 3 for evidence of discriminant validity was not nearly as positive as it was for criterion 2. Only the validity coefficient for the scale of power had satisfied the requirements for criterion 3 for all groups examined. The validity coefficients for the scales of excellence, stress, independence, and affiliation provided evidence for discriminant validity for three of the five groups, and the validity coefficient for the scale of aggression provided evidence for discriminant validity for two of the groups. The validity coefficient for the success scale was the one scale that did not satisfy the requirements for criterion 3 by all four subgroups of athletes tested as well as the group of all subjects.

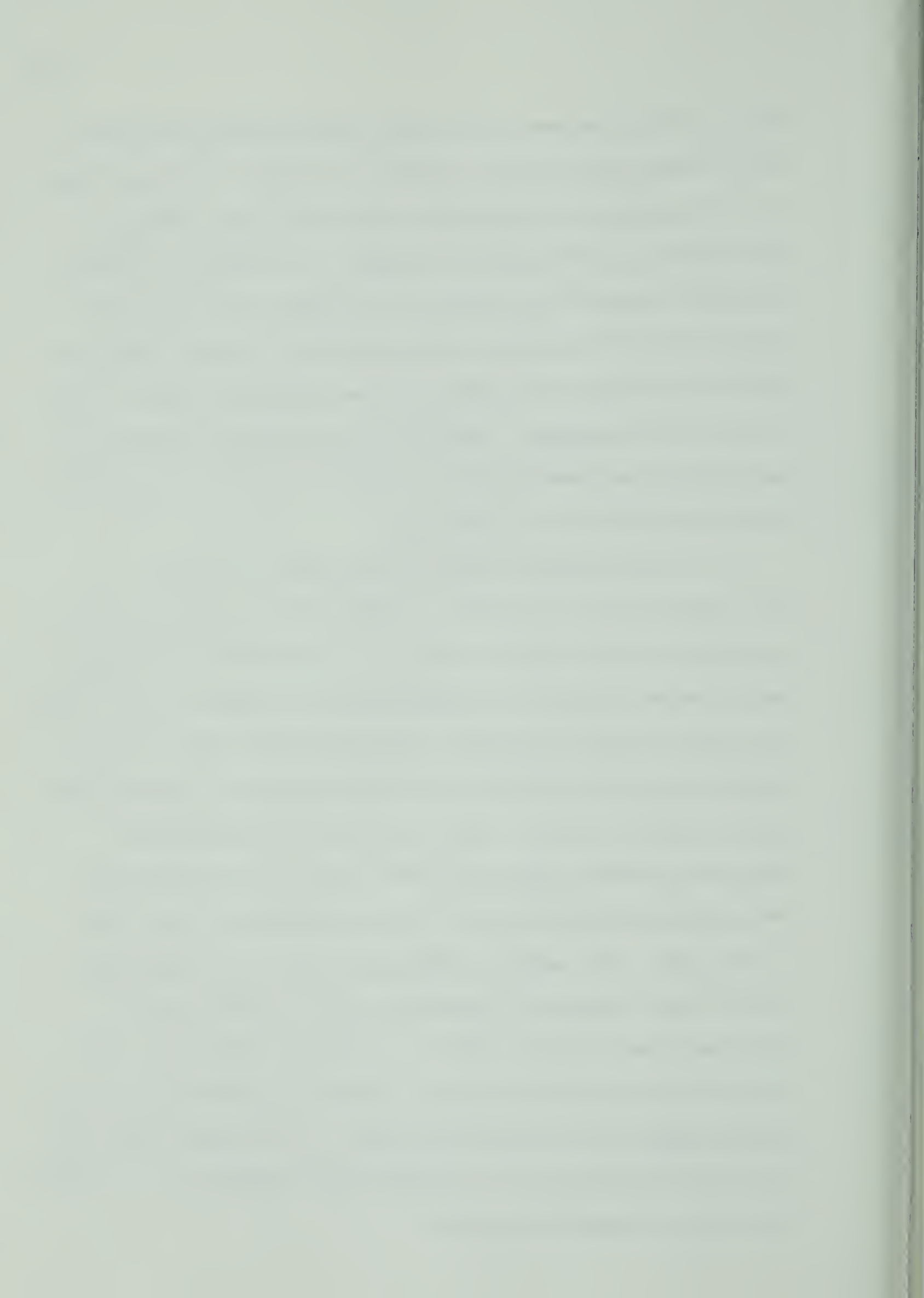
The evidence for discriminant validity via criterion 4 was good. The validity coefficients for three (excellence, stress, and independence) of the seven scales of the IMI had satisfied the requirements for criterion 4 for all groups. The scales of power and success had provided evidence for discriminant validity for three of the five groups, and the affiliation scale provided evidence for discriminant validity for four of the groups examined. The aggression scale provided evidence for discriminant validity for only two of the groups examined.

What was noticeable in Table 25 was that there was more consistency of results within a group from criterion 1 through to criterion 4 than there was between the groups tested. For example, for the



subgroup of male swimmers, the success scale was the only scale of the IMI that did not satisfy criteria 1, 2, and 3. It appeared that for this subgroup, six of the seven IMI scales showed evidence of both convergent and discriminant validity. As indicated previously, a desirable outcome of the study was to develop one inventory consisting of the IMI scales for use across sports, and thus, what was desired was similarity of results between the groups tested for each of the criteria examined. Power was the only scale of the IMI that had satisfied the requirements for criteria 1, 2, and 3 for the group of all subjects and for all subgroups.

The results presented from the evaluation of criteria 1, 2, and 4 supported the desirability of using one inventory across sports consisting of most of the IMI scales. As the validity coefficients for all scales of the IMI had satisfied the requirements for criterion 1 for four or more of the groups, one would tend to have more faith in these scales being appropriate for use across sports than in them being specific to a sport. And for criterion 2, the validity coefficients for all scales of the IMI except for the stress scale had satisfied the requirements for this criterion for four or more of the groups. The validity coefficients for all IMI scales except for the power, success, and aggression scales had satisfied the requirements for criterion 4 for four or more of the groups. Based on the results of the evaluation of criterion 3, only the power scale provided support for its use across sports. For the other six scales the validity coefficients had satisfied the requirements for criterion 3 for three or less of the groups.



Thus, for three (excellence, independence, and affiliation) of the seven IMI scales the validity was acceptable and, therefore, the application of these IMI scales across sports groups was supported from the evaluations with respect to the requirements for criteria 1, 2, and 4. For the scales of power, stress, success, and aggression the validity was less strong.

Evaluation of Construct Validity of the IMI by Principal-Axis Factoring, Varimax Rotation, and Orthogonal Procrustean Transformation

To examine similarity of structure of the IMI and PRF-E, separate principal-axis factorings with 1's in the principal diagonal (principal-components analysis) were carried out on the subtests of each inventory. The criteria of roots greater than 1 as well as the scree test (Tatsuoka, 1971) were used to determine the number of factors that were extracted. A separate orthogonal rotation by varimax was performed on the factors resulting from the principal-axis factorings. These two analyses were done for the group of all subjects ($n = 400$) and for each of the four subgroups (male basketball players, female basketball players, male swimmers, and female swimmers). In addition, an orthogonal procrustes to rotate the varimax factor loading matrix of the IMI to the varimax factoring loading matrix of the PRF-E was carried out for the group of all subjects. Also, the varimax factor loading matrix of the IMI for each subgroup was rotated to the varimax factor loading matrix of the IMI for all subjects to see if the subgroup results could be forced into a match with total group results.

Principal-Axis Factoring and Varimax Rotation

The pattern of characteristic roots (eigenvalues) for each principal-axis factoring was compared. Table 26 shows the eigenvalues from the IMI and the PRF-E factorings for the group of all subjects and for each of the four subgroups. Figures 1, 2, 3, 4, and 5 respectively show the eigenvalues for the IMI and the PRF-E factorings for all subjects and for each of the four subgroups (male basketball players, female basketball players, male swimmers, and female swimmers). As is evident from Table 26 and Figures 1 to 5, the pattern of roots appeared to be very similar from the factorings of the IMI and the PRF-E inventories both within a group and between the groups.

Using the previously stated criteria of roots greater than 1 as well as the graphs of the eigenvalues, three factors were extracted in all the principal-axis factorings. Table 27 provides the descriptions of the scales that loaded on the three factors from the varimax rotations of the IMI and the PRF-E for all subjects and for each subgroup. The factor loading matrices from varimax rotations of the scales of the IMI and PRF-E for the group of all subjects and for the subgroups of male basketball players, female basketball players, male swimmers, and female swimmers can be found in Tables 28, 29, 30, 31, and 32 respectively.

The minimum loading for interpretation of the factors was taken as $|\ .3 |$ (Gorsuch, 1974). Comparison of the varimax rotations of the scales of the IMI for all subjects and for each of the four subgroups showed some consistent results. A factor labelled by the scales of power, success, and aggression consistently appeared as

Table 26

Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for All Subjects and for Each Subgroup

Group	Inventory	Eigenvalues						
All Subjects	IMI	1.899	1.750	.989	.786	.592	.518	.467
	PRF-E	1.663	1.403	1.221	.818	.748	.601	.545
Male Basketball Players	IMI	1.830	1.672	1.071	.859	.622	.566	.381
	PRF-E	1.829	1.377	1.262	.845	.749	.507	.431
Female Basketball Players	IMI	1.993	1.628	.876	.838	.626	.578	.460
	PRF-E	1.734	1.311	1.172	.881	.810	.640	.452
Male Swimmers	IMI	2.030	1.493	.901	.862	.705	.606	.403
	PRF-E	1.806	1.479	1.141	.968	.637	.541	.428
Female Swimmers	IMI	2.173	1.570	1.062	.770	.608	.468	.350
	PRF-E	1.710	1.418	1.167	.908	.708	.563	.527

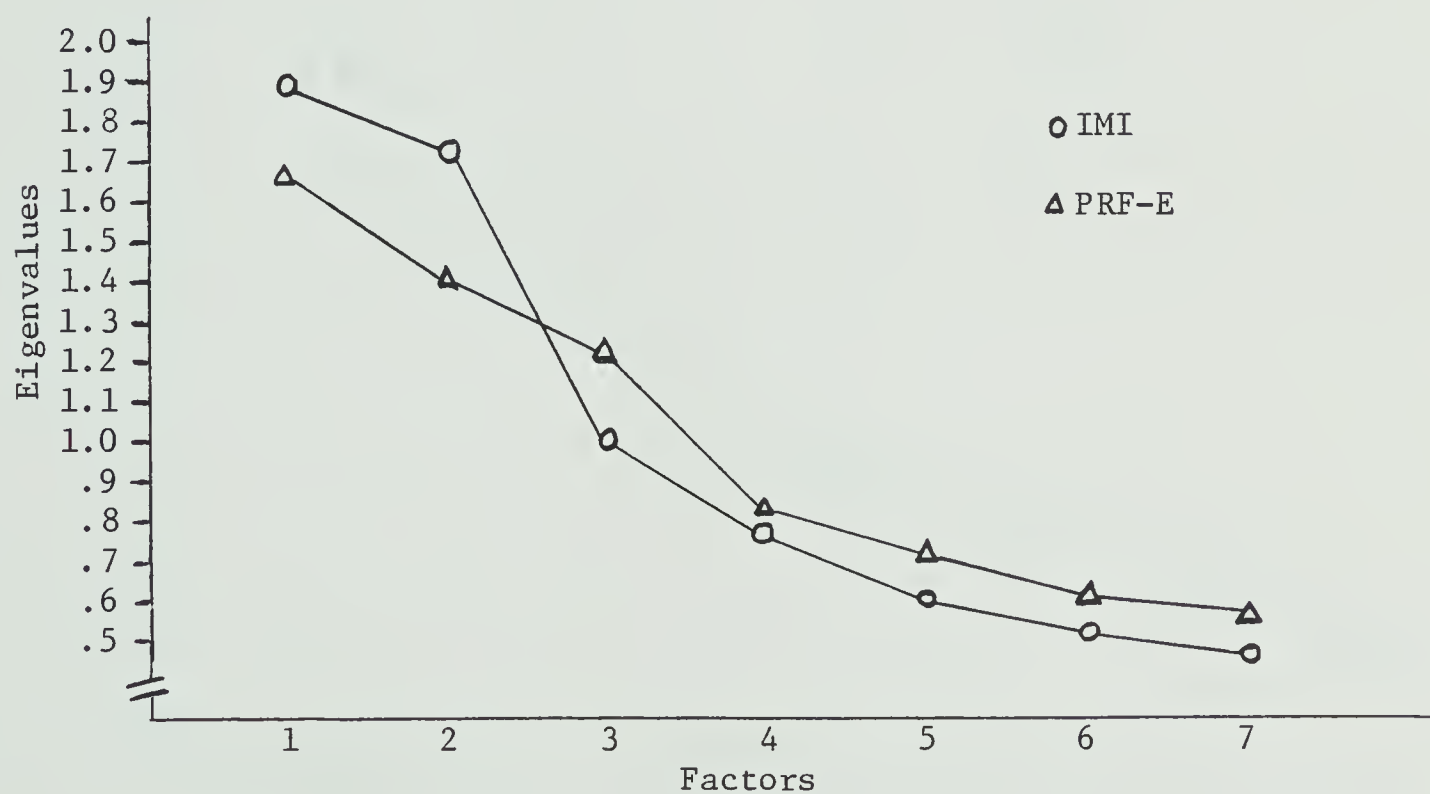


Figure 1: Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for All Subjects

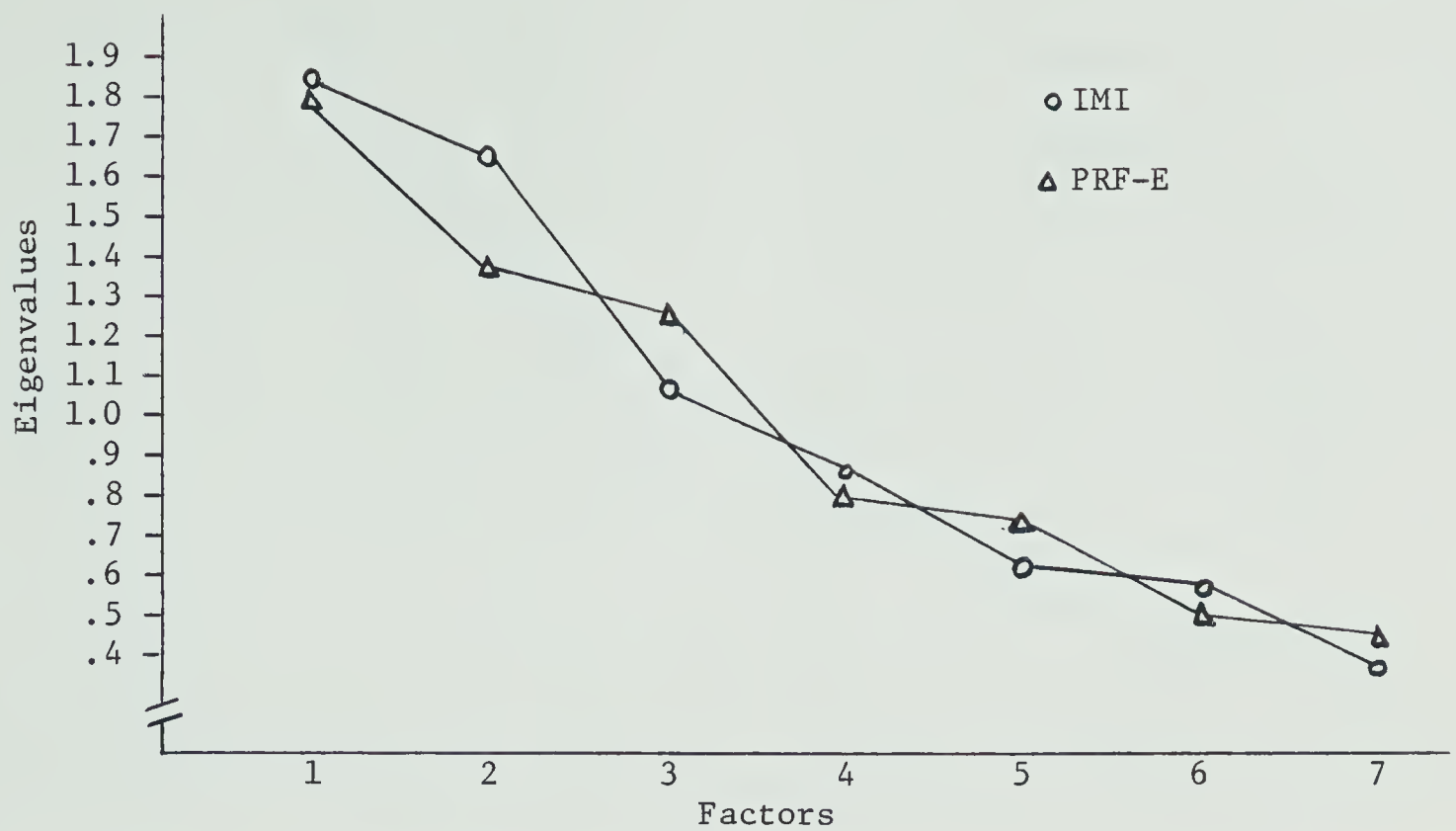


Figure 2: Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for Male Basketball Players

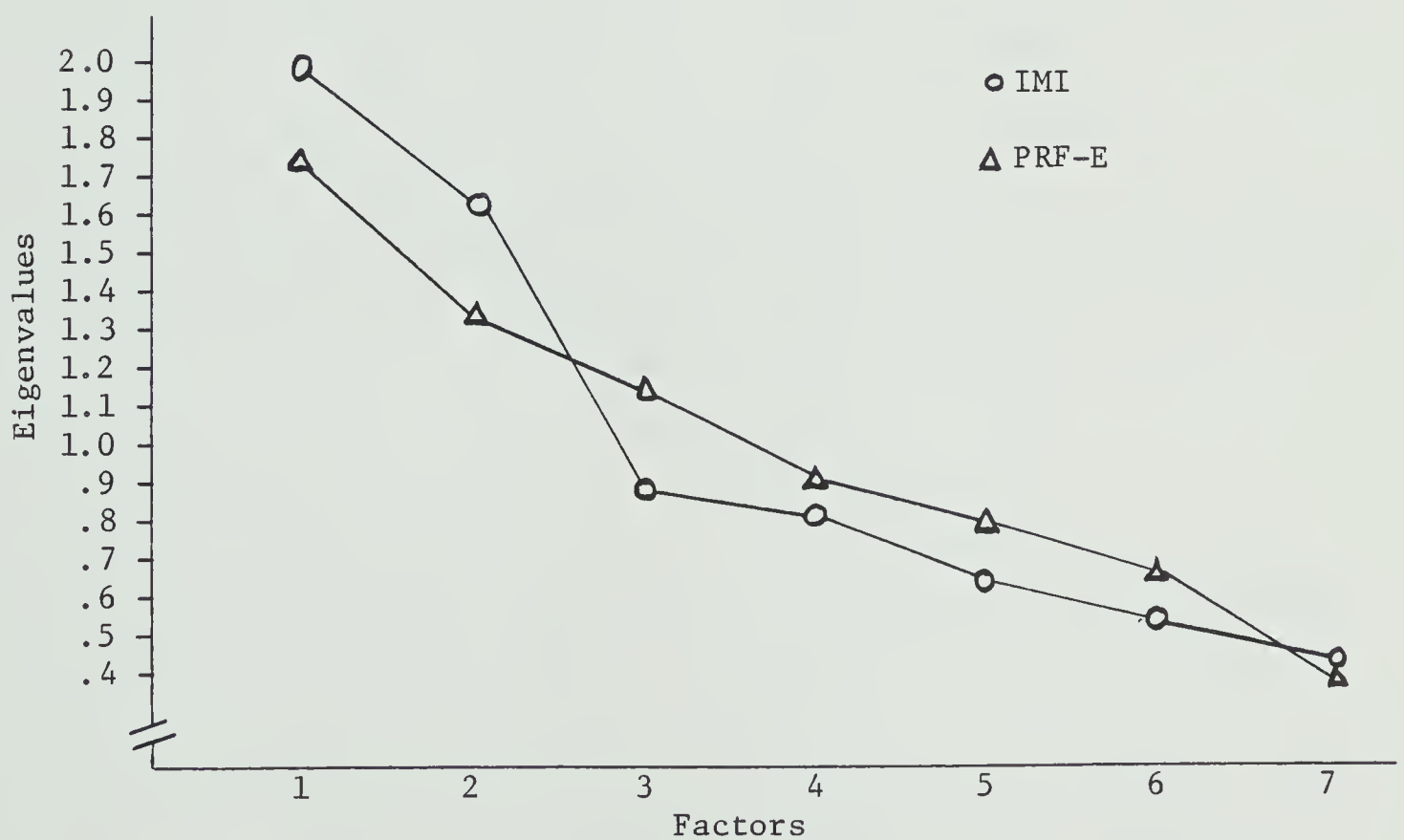


Figure 3: Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for Female Basketball Players

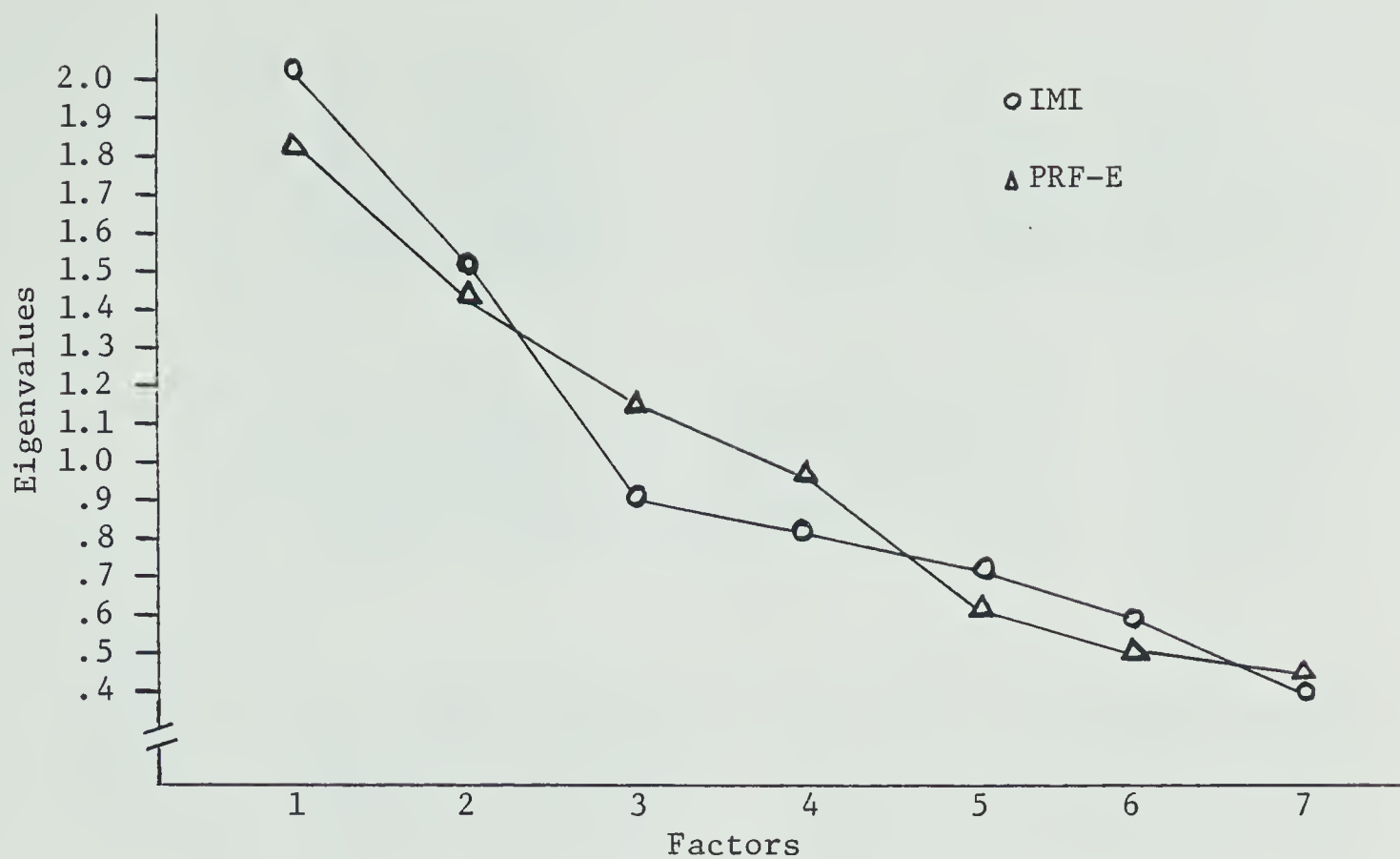


Figure 4: Eigenvalues from the IMI and the PRF-E Principal-Axis Factorings for Male Swimmers

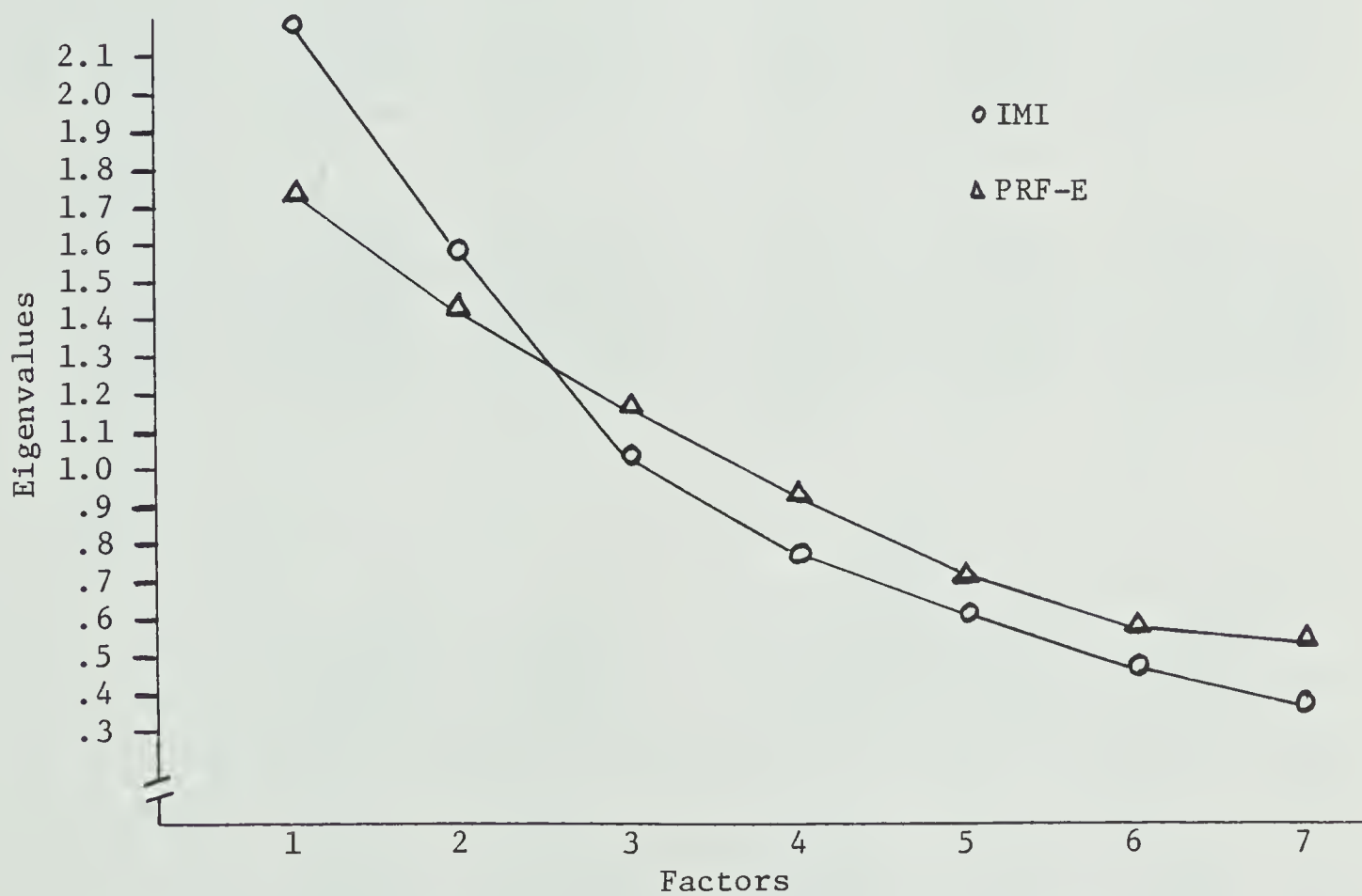


Figure 5: Eigenvalues from the IMI and PRF-E Principal-Axis Factorings for Female Swimmers

Table 27

Descriptions of Varimax Rotations of the Scales of the IMI
and PRF-E for all Subjects and for Each Subgroup

Group	Factors					
	IMI			PRF-E		
	1	2	3	1	2	3
All Subjects	Power Success Aggression	Excellence Independence Affiliation	Stress (Affiliation Loading)	Dominance Social Recognition Aggression	Autonomy Affiliation (Social Recognition Loading)	Achievement Change (Dominance & Affiliation Loadings)
Male Basketball Players	Power Success Aggression	Independence Affiliation (Excellence Loading)	Excellence Stress (Affiliation Loading)	Social Recognition Aggression (Dominance Loading)	Autonomy Affiliation (Social Recognition and Achievement Loadings)	Achievement Dominance Change
Female Basketball Players	Power Success Aggression (Independence Loading)	Excellence Independence (Success Loading)	Stress Affiliation	Dominance Social Recognition Affiliation	Autonomy Aggression (Affiliation Loading)	Achievement Change (Aggression Loading)
Male Swimmers	Power Success Aggression	Independence (Aggression Loading)	Excellence Stress Affiliation	Social Recognition Aggression (Dominance Loading)	Autonomy Affiliation	Achievement Dominance Change (Affiliation Loading)
Female Swimmers	Power Success Aggression	Excellence Independence Affiliation (Success Loading)	Stress (Power and Affiliation Loadings)	Social Recognition Aggression (Dominance Loading)	Autonomy Aggression (Dominance Loading)	Achievement Affiliation Dominance Change

Table 28

Factor Loading Matrices from Varimax Rotations of the Scales
of the IMI and the PRF-E for All Subjects

IMI	H**2 ^a	Factor			PRF-E	H**2	Factor		
		1	2	3			1	2	3
Scale 1	.475	.040	.630	.277	Scale 1	.535	.048	-.136	.717
Scale 2	.615	.737	-.058	.260	Scale 2	.636	.587	.037	.538
Scale 3	.781	.092	.094	.874	Scale 3	.512	-.206	.069	.682
Scale 4	.716	.094	-.808	.232	Scale 4	.771	.105	.862	.127
Scale 5	.753	.821	.222	-.173	Scale 5	.601	.667	-.389	-.072
Scale 6	.661	.779	-.226	.054	Scale 6	.668	.747	.294	-.155
Scale 7	.636	-.045	.643	.469	Scale 7	.565	.097	-.623	.408
Variance		1.846	1.576	1.215	Variance		1.413	1.395	1.479
% Total Variance		26.371%	22.517%	17.354%	% Total Variance		20.185%	19.932%	21.135%
% Common Variance		39.810%	33.992%	26.198%	% Common Variance		32.954%	32.541%	34.505%
Sum of Communalities =				4.637	Sum of Communalities =				4.288
Total Variance Accounted For =				66.242%	Total Variance Accounted For =				61.251%

Note. Scales of IMI: 1--Excellence, 2--Power, 3--Stress, 4--Independence, 5--Success, 6--Aggression and 7--Affiliation.

Scales of PRF-E: 1--Achievement, 2--Dominance, 3--Change, 4--Autonomy, 5--Social Recognition, 6--Aggression, and 7--Affiliation.

^aH**2 = communalities.

Table 29

Factor Loading Matrices from Varimax Rotations of the Scales
of the IMI and the PRF-E for Male Basketball Players

IMI	H**2	Factor			PRF-E	H**2	Factor		
		1	2	3			1	2	3
Scale 1	.503	.045	-.320	.631	Scale 1	.559	-.125	.378	.633
Scale 2	.532	.723	.084	-.052	Scale 2	.688	.410	.086	.715
Scale 3	.733	.073	.180	.834	Scale 3	.556	-.140	-.242	.691
Scale 4	.828	.012	.906	.083	Scale 4	.692	.159	-.783	.231
Scale 5	.706	.803	-.234	.082	Scale 5	.635	.607	.507	.095
Scale 6	.652	.774	.212	.092	Scale 5	.802	.879	-.149	-.088
Scale 7	.619	-.112	-.625	.465	Scale 7	.538	.132	.687	.218
Variance		1.785	1.453	1.335	Variance		1.387	1.574	1.508
% Total Variance		25.494%	20.757%	19.069%	% Total Variance		19.807%	22.486%	21.539%
% Common Variance		39.030%	31.777%	29.194%	% Common Variance		31.030%	35.227%	33.743%
Sum of Communalities =				4.572	Sum of Communalities =				4.468
Total Variance Accounted For =				65.320%	Total Variance Accounted For =				63.833%

Table 30

Factor Loading Matrices from Varimax Rotations of the Scales
of the IMI and the PRF-E for Female Basketball Players

IMI	H**2	Factor			PRF-E	H**2	Factor		
		1	2	3			1	2	3
Scale 1	.695	.172	.813	.065	Scale 1	.467	.037	.011	.682
Scale 2	.650	.752	-.107	.270	Scale 2	.609	.151	.705	.298
Scale 3	.703	.243	.028	.802	Scale 3	.699	-.038	.138	.824
Scale 4	.506	.326	-.566	-.282	Scale 4	.732	.789	-.171	.283
Scale 5	.573	.693	.300	-.052	Scale 5	.546	.030	.707	-.211
Scale 6	.691	.823	-.113	-.028	Scale 6	.599	.639	.282	-.333
Scale 7	.678	-.110	.222	.785	Scale 7	.565	-.351	.605	.275
Variance		1.931	1.145	1.420	Variance		1.181	1.492	1.544
% Total Variance		27.589%	16.361%	20.291%	% Total Variance		16.874%	21.319%	22.055%
% Common Variance		42.946%	25.468%	31.586%	% Common Variance		28.007%	35.385%	36.607%
Sum of Communalities =				4.497	Sum of Communalities =				4.217
Total Variance Accounted For =				64.242%	Total Variance Accounted For =				60.248%

Table 31

Factor Loading Matrices from Varimax Rotations of the Scales
of the IMI and the PRF-E for Male Swimmers

IMI	H**2	Factor			PRF-E	H**2	Factor		
		1	2	3			1	2	3
Scale 1	.607	-.235	.102	.736	Scale 1	.674	-.105	-.217	.785
Scale 2	.646	.783	-.122	.137	Scale 2	.706	.300	.221	.753
Scale 3	.397	.061	-.218	.588	Scale 3	.161	-.029	-.109	.384
Scale 4	.828	-.038	.890	-.183	Scale 4	.741	-.047	.859	.015
Scale 5	.568	.737	.043	-.149	Scale 5	.734	.801	-.304	-.023
Scale 6	.771	.666	.564	-.099	Scale 6	.759	.838	.237	.041
Scale 7	.607	.060	-.188	.754	Scale 7	.651	-.042	-.691	.414
Variance		1.663	1.221	1.540	Variance		1.448	1.473	1.505
% Total Variance		23.759%	17.437%	22.005%	% Total Variance		20.691%	21.042%	21.496%
% Common Variance		37.592%	27.590%	34.817%	% Common Variance		32.724%	33.279%	33.997%
Sum of Communalities =				4.424	Sum of Communalities =				4.426
Total Variance Accounted For =				63.202%	Total Variance Accounted For =				63.229%

Table 32

Factor Loading Matrices from Varimax Rotation of the Scales
of the IMI and the PRF-E for Female Swimmers

		Factor						Factor				
IMI		H**2	1	2	3	PRF-E			H**2	1	2	3
Scale	1	.656	.134	.784	.155	Scale	1	.617		-.101	-.059	.777
Scale	2	.616	.676	-.031	.398	Scale	2	.663		.382	.411	.590
Scale	3	.836	.118	.118	.899	Scale	3	.359		-.312	-.089	.504
Scale	4	.654	.170	-.754	.239	Scale	4	.738		-.492	.703	-.038
Scale	5	.837	.824	.307	-.250	Scale	5	.672		.819	-.027	-.031
Scale	6	.489	.671	-.119	.156	Scale	6	.742		.129	.844	-.110
Scale	7	.717	.080	.729	.422	Scale	7	.503		.131	-.079	.692
Variance			1.655	1.838	1.312	Variance				1.200	1.395	1.700
% Total Variance			23.640%	26.253%	18.746%	% Total Variance				17.136%	19.928%	24.279%
% Common Variance			34.441%	38.247%	27.311%	% Common Variance				27.935%	32.486%	39.580%
Sum of Communalities =					4.805	Sum of Communalities =						4.294
Total Variance Accounted For =					68.639%	Total Variance Accounted For =						61.343%

one of the three factors for all groups. Only with the female basketball players did another scale load $|.3|$ or greater on this factor. With this subgroup, the scale of independence had a loading of .326 but this loading was considerably lower than the loadings of power, success, and aggression (.752, .693, and .823 respectively) on this factor (see Table 30). For male swimmers, the scale of aggression had almost equal loadings on both the factor labelled by the scales of power, success, and aggression and a second factor. The other four scales of the IMI (excellence, stress, independence, and affiliation) did not show as consistent results for all groups examined.

The scales of independence and affiliation loaded on the same factor for three groups (all subjects, male basketball players, and female swimmers). As would be expected, if the independence scale had a negative loading on a particular factor, the affiliation scale would have a positive loading on that same factor and vice-versa. For two of these three groups (all subjects and female swimmers) the scale of excellence also loaded on the same factor as the scales of independence and affiliation. For male basketball players the scale of excellence had a low loading ($-.320$) on the same factor as the scales of independence and affiliation but its main loading was not on this factor.

The scales of stress and affiliation were the other combination from these four scales that appeared to be fairly consistent for all groups. For male swimmers and female basketball players major loadings on a factor were the stress and affiliation scales whereas for the other three groups, the scale of stress was a major loading on a factor

and the scale of affiliation loaded $|.3|$ or greater on this same factor but its main loading was not on this factor. However, for two of these three groups (all subjects and male basketball players) the scale of affiliation had loadings on the factor labelled with the stress scale almost equal in value to their respective main loadings of the affiliation scale on the same factor as the independence scale. And for the third group (female swimmers) the scale of affiliation had a substantial loading on the factor labelled by the stress scale.

Tables 28, 29, 30, 31, and 32 also show that the sum of the communalities for the three factors of the varimax rotations of the seven scales of the IMI ranged from 4.424 to 4.805 for the groups examined. Also, the total variance accounted for by the three factors ranged from 63.202% to 68.639% for all groups examined.

A comparison was done of the varimax rotations of the scales of the PRF-E for all subjects and for each of the four subgroups of athletes. The factor structure of the PRF-E for the group of all subjects and for each of the subgroups was not nearly as consistent as the factor structure of the IMI for all groups. The most consistent result was the loadings of the scales of achievement and change on the same factor for all five groups. However, for male basketball players, male swimmers, and female swimmers the scale of dominance also had its major loading on this same factor, and for the group of all subjects the scale of dominance had almost equal loadings on both this factor and a second factor. For female swimmers the scale of dominance loaded fairly equally on all three factors and the scale of change also loaded substantially on a second factor.

The loadings of the scales of autonomy and affiliation were on the same factor for three of the five groups (all subjects, male basketball players, and male swimmers). As with the independence and affiliation scales of the IMI, if the autonomy scale of the PRF-E had a negative loading on a particular factor the affiliation scale would have a positive loading on that same factor and vice-versa. For both the group of all subjects and the subgroup of male swimmers, the scale of affiliation loaded substantially not only on the factor that independence loaded on but also on a second factor. For the group of all subjects and the subgroup of male basketball players, the scale of social recognition also loaded substantially on the same factor as the scales of autonomy and affiliation. Also, for male basketball players the scale of social recognition had almost equal loadings on the factor labelled by the autonomy and affiliation scales and a second factor. Also, for this subgroup, the scale of achievement loaded on this same factor but its major loading was not on this factor. With the female basketball players, the scale of affiliation had a substantial loading on the same factor as the autonomy scale although its major loading was not on this factor. Only with the female swimmers did the two scales of autonomy and affiliation not load on the same factor.

Tables 28, 29, 30, 31, and 32 show that the sum of the communalities for the three factors of the varimax rotations of the seven scales of the PRF-E ranged from 4.217 to 4.468 for the groups examined. Also, the total variance accounted for by the three factors ranged from 60.248% to 63.833% for all the groups examined. The upper limit

of the variance accounted for by the PRF-E compared to the lower limit of the variance accounted for by the IMI (63.202%).

The factor structure of the seven scales of the IMI was very similar to the factor structure of the corresponding scales of the PRF-E for the group of all subjects. The scales of power, success, and aggression identified one of the factors of the IMI. The corresponding scales of dominance, social recognition, and aggression respectively identified one of the factors of the PRF-E. A second factor of the IMI was labelled by the scales of independence, affiliation, and excellence. Two of the corresponding scales of the PRF-E--autonomy and affiliation respectively identified a second factor of this inventory. However, the scale of social recognition also loaded on this same factor although its loading was considerably lower than its main loading on the factor with which it was identified.

The third factor of the IMI was identified by the remaining scale of the IMI--the stress scale. However, the scale of affiliation loaded almost as equally on this factor as it did with the factor that independence had loaded on. For the PRF-E, the scales of change (corresponds to the stress scale of the IMI) and achievement (corresponds to the excellence scale of IMI) loaded on the third and final factor extracted. However, both the scales of affiliation and dominance (corresponds to the power scale of the IMI) had loadings on this third factor almost equal in value to their respective loadings on the factors they were primarily identified with.

From the preceding, it appears that the major inconsistency was the loading of the excellence scale of the IMI on the same factor as

the scales of independence and affiliation, and the loading of the corresponding achievement scale of the PRF-E on the same factor as the scale of change. The factor structure for six of the seven scales of the IMI and the PRF-E appeared to be very congruent.

It will be recalled that a desirable outcome of this study was to develop one inventory that could be appropriately used in all sports to measure the incentives as defined by the scales of the IMI. From the analyses presented in this section, it appears that for three of the seven scales (power, success, and aggression) it is appropriate to use them across sports but for the other four scales the evidence was less convincing.

Orthogonal Procrustean Transformation

To examine the degree to which the factor structure of the IMI for the group of all subjects was a good fit to the factor structure of the PRF-E for the group of all subjects, the IMI varimax factor loading matrix was rotated to the PRF-E varimax factor loading matrix. The error matrix (difference between rotated IMI matrix and target matrix (PRF-E)) provided the assessment of the degree of similarity between the factor structures of the seven scales of both inventories. This error matrix can be found in Table 33. The rotated IMI matrix can be found in Appendix C (Table 51) and the target matrix (PRF-E) can be found in Table 28 (supra, p. 169).

Three criteria were used to aid in the interpretation of the rotation of the IMI factor structure to the PRF-E factor structure. Two of these criteria were used to examine the factor loading matrices of both the IMI and the PRF-E. Firstly, a minimum loading of $|.3|$

was needed to interpret a scale as loading on one of the three factors. Secondly, a scale was considered to be loading on more than one factor if the difference in loadings for that scale was $|.25|$ or less. The third criterion was used to examine the error matrix. Attention was given to any loading in the error matrix that was $|.25|$ or greater.

Based on the criteria outlined above, scale 1 (excellence) of the IMI was not a good fit to scale 1 (achievement) of the PRF-E. Scale 1 of the rotated IMI matrix loaded almost equally on both factors 2 and 3 whereas scale 1 of the PRF-E target matrix loaded only on factor 3. Scales 2, 3, 4, 5, 6, and 7 (power, stress, independence, success, aggression, and affiliation respectively) of the IMI were good fits to scales 2, 3, 4, 5, 6, and 7 (dominance, change, autonomy, social recognition, aggression, and affiliation respectively) of the PRF-E respectively.

Table 33

Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix and Target Matrix (PRF-E) for All Subjects

Scale	Factor		
	1	2	3
1	.055	.397	.280
2	-.115	-.096	.217
3	-.193	-.075	-.190
4	.021	.021	.109
5	-.164	-.137	-.063
6	-.026	.155	-.239
7	.211	-.129	-.207

The results reported from rotating the IMI varimax factor loading matrix to the PRF-E varimax factor loading matrix have to be very encouraging indeed. To the extent that the PRF-E is a valid inventory, and to the extent that the scales of the IMI were good fits to the respective scales of the PRF-E, evidence for convergent and discriminant validity of the IMI scales was provided. Thus, for six of the seven IMI scales one can conclude that they exhibited a degree of validity for measuring those attributes they were designed to measure. The scale of excellence was the one IMI scale that has to be carefully reevaluated.

It was concluded that for six of the seven scales the factor structure of the IMI was a good fit to the factor structure of the PRF-E for the group of all subjects. And further, that for these six scales of the IMI evidence for the validity of them was provided. It is important to restate that a desirable outcome of this study was to have one inventory that could be used in all sports to measure the incentives as defined by the IMI scales. To assess the validity of the scales of the IMI for this purpose, it would seem appropriate to rotate the factor structure of the IMI for each subgroup to one solution (the factor structure of the IMI for all subjects ($n = 400$)).

Thus, the next step was to examine the degree to which the factor structure of the IMI for each of the four subgroups of athletes tested was a good fit to the factor structure of the IMI for all subjects. The IMI varimax factor loading matrix for each subgroup was rotated to the IMI varimax factor loading matrix for

all subjects. The error matrices (difference between rotated IMI matrix for each subgroup and the target matrix (IMI for all subjects)) provided the assessment of the degree of similarity of the factor structures of the seven scales of the IMI between each subgroup and the total group. The error matrices for the subgroups of male basketball players, female basketball players, male swimmers, and female swimmers can be found in Tables 34, 35, 36, and 37 respectively. The rotated IMI matrices for the four subgroups of athletes can be found in Appendix C (Tables 52, 53, 54, and 55 respectively). The target matrix (IMI for all subjects) for each of these four subgroups can be found in Table 28 (supra, p. 169).

Table 34

Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix for Male Basketball Players and the Target Matrix (IMI Varimax Factor Loading Matrix for All Subjects)

Scale	Factor		
	1	2	3
1	-.022	.140	-.232
2	.016	.034	.313
3	-.013	.024	.027
4	.065	.035	-.109
5	.020	-.030	-.154
6	-.000	-.053	-.067
7	.060	-.089	.201

Table 35

Error Matrix--Difference Between Rotated IMI Varimax Factor Loading
Matrix for Female Basketball Players and the Target Matrix
(IMI Varimax Factor Loading Matrix for All Subjects)

Scale	Factor		
	1	2	3
1	-.254	-.135	.428
2	.034	.059	-.114
3	-.093	-.142	.091
4	-.159	-.146	.300
5	.087	.044	-.119
6	-.016	-.004	-.047
7	.086	.183	-.201

Table 36

Error Matrix--Difference Between Rotated IMI Varimax Factor Loading
Matrix for Male Swimmers and the Target Matrix
(IMI Varimax Factor Loading Matrix for All Subjects)

Scale	Factor		
	1	2	3
1	.275	.398	-.429
2	-.022	-.321	.229
3	.069	-.383	.461
4	.020	.060	-.029
5	.081	.244	-.033
6	.048	.236	-.098
7	-.067	.115	-.104

Table 37

Error Matrix--Difference Between Rotated IMI Varimax Factor Loading Matrix for Female Swimmers and the Target Matrix
(IMI Varimax Factor Loading Matrix for All Subjects)

Scale	Factor		
	1	2	3
1	-.106	-.134	.051
2	.060	.018	-.129
3	-.032	.060	-.031
4	-.067	-.034	.064
5	-.006	-.097	.052
6	.109	-.084	-.087
7	-.137	-.043	-.018

The criteria previously outlined (supra, p. 178) to interpret the rotation of the IMI factor structure to the PRF-E factor structure for the group of all subjects were also used to examine the rotations of the factor structure of the IMI for each subgroup to the IMI factor structure for the total group. Table 38 provides a summary of the interpretations of the rotations of the IMI varimax factor loading matrix for each subgroup to the IMI varimax factor loading matrix for all subjects.

A scale of the IMI for any of the four subgroups that appeared under the column heading "Good Fit" meant that the loadings for that scale on the three factors extracted were very similar to the loadings reported for that same scale for all subjects. Any value in the error

matrix was also always less than $|.25|$. The column heading "Appears to be Good Fit" meant that values in the error matrix for a scale of the IMI for any of the subgroups were always $|.25|$ or greater. This error in fit always occurred because of a low loading ($<|.3|$) of a scale on a factor for one of the two comparison groups and a near zero loading by the second group for that scale on the same factor. However, the scale appeared under the column "Appears to be Good Fit" because its primary loading was always on the same factor for both comparison groups.

Table 38

Summary of Interpretations of Rotations of IMI Factor Structure for Each Subgroup to the IMI Factor Structure for All Subjects

Subgroup	IMI Scales		
	Good Fit	Appears to be Good Fit	Not Good Fit
Male Basketball Players	3, 4, 5, 6	2	1, 7
Female Basketball Players	2, 3, 5, 6, 7	1, 4	
Male Swimmers	4, 5, 6, 7	2	1, 3
Female Swimmers	1, 2, 3, 4, 5, 6, 7		

Note. Scales of IMI: 1--excellence, 2--power, 3--stress, 4--independence, 5--success, 6--aggression, and 7--affiliation.

A scale of the IMI for any of the subgroups that was placed under the column heading "Not Good Fit" meant that the loadings for that scale on the three factors extracted were not very similar to the loadings reported for that scale for all subjects. There were two major reasons for the differences that were noted: firstly, a scale for one group loaded primarily on only one factor and had loadings less than $|.3|$ on the other two factors whereas for the comparison group that scale loaded almost equally on two factors; and secondly, for both comparison groups loadings for a scale were primarily on only one factor but the loadings were on different factors for each group. The values in the error matrix for these scales were not always $|.25|$ or greater.

Thus, in Table 38, those scales for any of the subgroups falling under the columns "Good Fit" and "Appears to be Good Fit" were considered to have acceptable levels of fit to the IMI factor structure for all subjects. The two columns were used to separate degrees of acceptable fit. That is, for any subgroup, any scale that appeared in one of these two columns was concluded to be a good fit to the IMI factor structure for all subjects but the scales in the "Good Fit" column came closer to approximating the factor structure of the IMI scales for all subjects than those appearing in the "Appears to be Good Fit" column. To the extent that the same scales appeared in these two columns for each subgroup, one would have faith in the appropriateness of using one inventory across sports consisting of these scales.

All scales except 1, 3, and 7 (excellence, stress and affiliation

respectively) consistently appeared in either the "Good Fit" column or "Appears to be Good Fit" column. Thus, for scales 2, 4, 5, and 6 (power, independence, success, and aggression respectively) it would appear to be very appropriate to use one inventory consisting of these four scales. For three out of the four subgroups both the scales of affiliation (7) and stress (3) were good fits to the respective scales of affiliation and stress for all subjects. However, for male basketball players, the scale of affiliation did not fit the factor structure of the affiliation scale for all subjects, and for male swimmers, the scale of stress did not fit the factor structure of the stress scale for all subjects. Since these two scales were good fits to the respective scales for all subjects by three of the four subgroups, one would tend to have more faith in these scales being appropriate for use across sports than in them being specific to a sport. However, the exact nature of these two scales may have to be redefined.

The appropriateness of the scale of excellence (1) for use across sports was not nearly as positive as for the other six scales of the IMI. The excellence scale for both male basketball players and male swimmers was not a good fit to the excellence scale for all subjects. Thus, for two of the subgroups of athletes tested this scale was not a good fit to the respective scale for all subjects. Also, one needs to recall that the excellence scale for all subjects was not a good fit to the corresponding achievement scale of the PRF-E. These two points would tend to seriously weigh against the excellence scale as defined as being appropriate for use across sports.

To summarize, for four out of the seven IMI scales (power, independence, success, and aggression) the validity was supported across sport groups. For two out of the remaining three scales (stress and affiliation) the validity was less strong. For the scale of excellence the validity was weak.

Comparison of the Two Major Analyses Used to Evaluate the Construct Validity of the IMI

The analyses of the construct validity of the IMI by the first method of correlational criteria as outlined by Campbell and Fiske (1959) and by the second method of principal-axis factoring, varimax rotation, and orthogonal procrustean transformation led to different results. The most encouraging results were those resulting from the second method. With the second method, the validity of all the IMI scales except for the excellence scale was acceptable and thus, the desired outcome, which was to use the IMI across sport groups to measure sport-specific constructs, was achieved for these six scales.

With the first method, the validity of three (excellence, independence, and affiliation) of the IMI scales was acceptable when three of the four criteria (criteria 1, 2, and 4) as outlined by Campbell and Fiske (1959) were used. The support for use of the remaining four scales--power, stress, success, and aggression--across sports groups was less strong. However, when the third criterion was included, the validity of none of the IMI scales was acceptable to all four criteria.

Which method provides the more realistic appraisal of the construct validity of the IMI? It may be that the results based on the

second method come closer to the true state of the IMI than the results from the first method. The factor analytic method was a much more holistic approach to the data than the correlational method. The Campbell and Fiske (1959) criteria have been criticized as a technique of assessing construct validity primarily because of its piecemeal approach to the evaluation of the data and the arbitrary decisions that have to be made with some of the criteria (Schmitt, Coyle, and Saari, 1977). The major decision that had to be made arbitrarily was what constituted a satisfactory proportion when the data were being evaluated with respect to criteria 2, 3, and 4. Researchers have counted the number of correlations in appropriate rows and columns of the matrices which exceed the respective convergent validity coefficients and have reported the results as a proportion or have done a chi-square test against an expected fifty-fifty split. As well, this procedure becomes increasingly cumbersome as the number of incentives and methods increase.

With the present study, 75% was arbitrarily chosen as the percentage which would be satisfactory for evaluating the data via criteria 2, 3, and 4. However, in actuality, this percentage could never have been less than 83.33% (5/6). This percentage may have in fact been too stringent. If 4/6 had been used as a satisfactory proportion (i.e. 66.67%) then the results would have been very similar to those reported by the factor analytic method. The following scales would not have satisfied criteria 2, 3, and 4 using a proportion of 4/6:

<u>Group</u>	<u>IMI Scales Not Satisfying the Requirements of the Respective Criteria 2, 3, and 4</u>		
	2	3	4
All Subjects	--	--	--
Male Basketball Players	--	Stress	--
Female Basketball Players	Independence	Independence Affiliation	--
Male Swimmers	Success	Success	--
Female Swimmers	--	Excellence	Affiliation

These results were considerably different from those reported in Table 25 (supra, p. 159) for criteria 2 and 4 and especially criterion 3 when the criterion percentage of at least 75% was used. Using the 4/6 proportion, the validity coefficients for all the IMI scales provided evidence for discriminant validity for at least four of the five groups. Thus, using this lower criterion percentage, the discriminant validity of all the IMI scales would be acceptable. And, as previously indicated (supra, p. 160), the validity coefficients for all the IMI scales provided evidence for convergent validity for at least four of the five groups. Thus, the convergent and discriminant validity of all the IMI scales would be acceptable.

With the Campbell and Fiske (1959) criteria a technique to summarize the degree to which the data as a whole satisfied the criteria would be useful especially when the values of the validity coefficients are close to the values reported in the rest of the matrices. It does not seem that the piecemeal approach of pairwise comparisons of correlations was particularly satisfactory especially when interested in the degree to which all the data in the matrices

met the criteria. The factor analytic method appeared to evaluate the degree of fit of all the data in the matrices as a whole for evidence of convergent and discriminant validity of the IMI.

Notwithstanding the results presented, it would appear, with some degree of confidence, that based on the correlational method as outlined by Campbell and Fiske (1959) the construct validity of all the IMI scales was acceptable. Based on the factor analytic method the construct validity of all the IMI scales except for the excellence scale was acceptable. Thus, the use of seven and six scales of the IMI respectively to measure sport-specific constructs across sport groups was supported. The seven scales of the IMI were: excellence, power, stress, independence, success, aggression, and affiliation.

From the factor analytic method the exact nature and interpretation of the excellence scale as well as its relationship with the other IMI scales was not particularly clear. From the results presented, it appeared that the scale of excellence has different meanings for the subgroups of athletes tested and that these differences were more related to sex differences than sport differences. For the female athletes tested in basketball and swimming, the excellence scale was related positively to the affiliation scale and negatively to the independence scale. It seemed that affiliation incentives may be perceived by female athletes as being necessary for the attainment of excellence. For male basketball players, excellence had this same relationship with the affiliation and independence scales but as well excellence was also related positively to the stress scale; and for male swimmers, excellence was related positively to both the stress and

affiliation scales. Thus, for male athletes, it appeared that not only affiliation incentives but also stress incentives were perceived as being necessary to the attainment of excellence. The excellence scale of the IMI warrants reexamination.

Reliability of The Alberta IMI

Internal Consistency

Table 39 presents the alpha coefficients of the seven IMI scales for the group of all subjects and for the four subgroups of athletes.

Table 39
Alpha Coefficients of the Seven IMI Scales
for the Groups of Athletes Tested

Group	Scales of the IMI						
	Excel- lence	Power	Stress	Indepen- dence	Success	Aggression	Affili- ation
All Subjects	.608	.561	.465	.503	.542	.724	.615
Male Basketball Players	.675	.512	.314	.596	.534	.783	.618
Female Basketball Players	.434	.617	.547	.503	.423	.595	.481
Male Swimmers	.549	.401	.540	.424	.469	.613	.658
Female Swimmers	.678	.556	.453	.477	.565	.531	.642

As can be seen from Table 39, the alpha coefficients ranged from .31 to .78. However 86% of these coefficients ranged from .45 to .78. In comparison to the internal consistency coefficients reported for these seven scales from the pilot study (supra, p. 111) the coefficients improved for all scales except success and power. In light of the fact that there were only 10 items per scale, the majority of the reliability coefficients reported were considered adequate.

The scales of excellence, aggression, and affiliation appeared to have the strongest measures of internal consistency whereas the measures of internal consistency for the scales of power, independence, and success were less strong. The internal consistency for the stress scale was the weakest of the seven IMI scales.

It is also evident from the alpha coefficients that the items measuring each of the individual scales were not as homogeneous as desired. This was especially true for the scales of independence, success, and stress. Thus, some of these scales are not measuring a single variable to the extent desired. However, it may be that some of these scales are more multifaceted than was originally thought. Alternately, an inadequate sampling of content (i.e., insufficient number of items) may have contributed to the coefficients reported for some of the IMI scales.

These alpha coefficients would suggest that a more careful examination of the content of the items making up the specific scales is warranted. Elimination of specific items and/or revisions of specific items may improve the internal consistency of the scales.

However, it may be necessary to increase the number of items per scale to improve appreciably the internal consistency of the IMI scales.

Test-Retest Reliability

Tables 40, 41, 42, 43, and 44 respectively provide the test-retest coefficients for the group of all subjects and for the four subgroups of athletes--male basketball players, female basketball players, male swimmers, and female swimmers. These coefficients were computed using a time interval of not less than two weeks and not greater than three weeks. The lower and upper limits for these reliability coefficients at the .95 confidence level are also given.

Table 40

Test-Retest Reliability Coefficients of the Seven IMI
Scales for All Subjects (n = 200)

Scale	Reliability Coefficient r_{xx}	Lower Limit for r_{xx}	Upper Limit for r_{xx}
Excellence	.691	.611	.758
Power	.619	.526	.698
Stress	.624	.531	.702
Independence	.691	.611	.758
Success	.736	.665	.793
Aggression	.748	.680	.803
Affiliation	.671	.587	.741

Table 41

Test-Retest Reliability Coefficients of the Seven IMI
Scales for Male Basketball Players (n = 50)

Scale	Reliability Coefficient r_{xx}	Lower Limit for r_{xx}	Upper Limit for r_{xx}
Excellence	.660	.468	.793
Power	.468	.218	.660
Stress	.608	.397	.758
Independence	.728	.564	.837
Success	.759	.609	.857
Aggression	.603	.390	.755
Affiliation	.617	.409	.764

Table 42

Test-Retest Reliability Coefficients of the Seven IMI
Scales for Female Basketball Players (n = 50)

Scale	Reliability Coefficient r_{xx}	Lower Limit for r_{xx}	Upper Limit for r_{xx}
Excellence	.540	.308	.712
Power	.728	.564	.837
Stress	.534	.300	.708
Independence	.509	.268	.689
Success	.596	.381	.750
Aggression	.844	.739	.909
Affiliation	.664	.473	.796

Table 43

Test-Retest Reliability Coefficients of the Seven IMI
Scales for Male Swimmers (n = 50)

Scale	Reliability Coefficient r_{xx}	Lower Limit for r_{xx}	Upper Limit for r_{xx}
Excellence	.610	.399	.759
Power	.468	.218	.660
Stress	.676	.490	.803
Independence	.691	.511	.813
Success	.712	.541	.825
Aggression	.699	.522	.823
Affiliation	.608	.397	.758

Table 44

Test-Retest Reliability Coefficients of the Seven IMI
Scales for Female Swimmers (n = 50)

Scale	Reliability Coefficient r_{xx}	Lower Limit for r_{xx}	Upper Limit for r_{xx}
Excellence	.801	.673	.883
Power	.714	.544	.807
Stress	.612	.402	.761
Independence	.757	.607	.856
Success	.791	.657	.877
Aggression	.649	.453	.786
Affiliation	.767	.622	.862

As can be seen from Tables 40 to 44, the test-retest coefficients ranged from .468 to .844. However, only the coefficients for the power scale for male basketball players and male swimmers and the scales of excellence, stress, independence, and success for female basketball players were less than .60. All of the other test-retest coefficients for the group of all subjects and the four subgroups of athletes met at least the accepted criterion level which usually is recognized to be between .60 and .70 (Martens, 1977). A combination of inconsistent responding and a narrow range of scores may have produced the lower reliabilities.

In summary, however, it can be stated, with some degree of confidence, that the seven scales of the IMI are reliable in terms of stability over time for the group of all subjects and for the subgroup of female swimmers. It would appear that all scales of the IMI except for the power scale are reliable for the subgroups of male basketball players and male swimmers. For female basketball players, the reliability of four (excellence, stress, independence, and success) of the seven IMI scales was weak. However, for the other three (power, aggression, and affiliation) scales the reliability coefficients for female basketball players were high. In fact, the coefficients for the scales of power and aggression were higher than the corresponding coefficients for any of the other groups and the coefficient for the affiliation scale was higher than the corresponding coefficients for at least two of the other groups.

Comparison of the IMI Subtest Scores

Mean Scores of Incentive Systems

The means and standard deviations of the seven IMI subtests for the four subgroups of athletes are presented in Table 45. Although the incentive systems of excellence, affiliation, stress, and success consistently had the highest mean scores and the incentive systems of power, aggression, and independence consistently had the lowest mean scores for all subgroups, any interpretation of these incentive systems with respect to their ranking and importance to the athletes is not possible without appropriate norms.

Differences Within Each Incentive System

Appendix D contains the summaries of the two-way analysis of variance on each of the IMI subtests. As well, Scheffé contrasts of the subgroups whenever significant interactions resulted are presented in this Appendix.

Although a significant disordinal sport x sex interaction resulted on the IMI subtest of excellence, Scheffé contrasts did not result in any significant differences between all comparisons of the subgroups. Figure 6 illustrates this significant interaction. There were no important differences between males and females in basketball and swimming on the IMI subtest of excellence.

Significant results were obtained on the sex factor for the IMI subtest of power. Male athletes in basketball and swimming scored significantly higher than female athletes in these two sports. There were no significant differences on the IMI subtest of stress for the

Table 45
Means and Standard Deviations of the Seven IMI Subtests
for the Four Subgroups of Athletes

Subgroup	IMI Subtests													
	Excellence <u>M</u> <u>SD</u>	Power <u>M</u> <u>SD</u>	Stress <u>M</u> <u>SD</u>	Independence <u>M</u> <u>SD</u>	Success <u>M</u> <u>SD</u>	Aggression <u>M</u> <u>SD</u>	Affiliation <u>M</u> <u>SD</u>							
Male Basketball Players	33.15 3.59	22.39 3.34	26.56 3.08	16.16 3.37	27.12 3.76	23.85 5.53	30.17 3.61							
Female Basketball Players	33.98 2.43	19.86 3.25	26.49 3.32	15.95 2.81	24.15 3.16	19.00 3.42	31.52 2.96							
Male Swimmers	34.00 3.05	21.98 3.05	26.41 3.81	15.33 2.89	27.04 3.71	20.65 4.26	31.19 3.74							
Female Swimmers	33.57 3.75	20.32 3.71	25.76 3.46	14.97 3.01	25.55 4.13	18.08 3.53	30.48 3.87							

Note. M denotes mean; SD denotes standard deviation.

four subgroups of athletes. Significant results were obtained on the sport factor for the IMI subtest of independence. Males and females in basketball scored significantly higher than males and females in swimming.

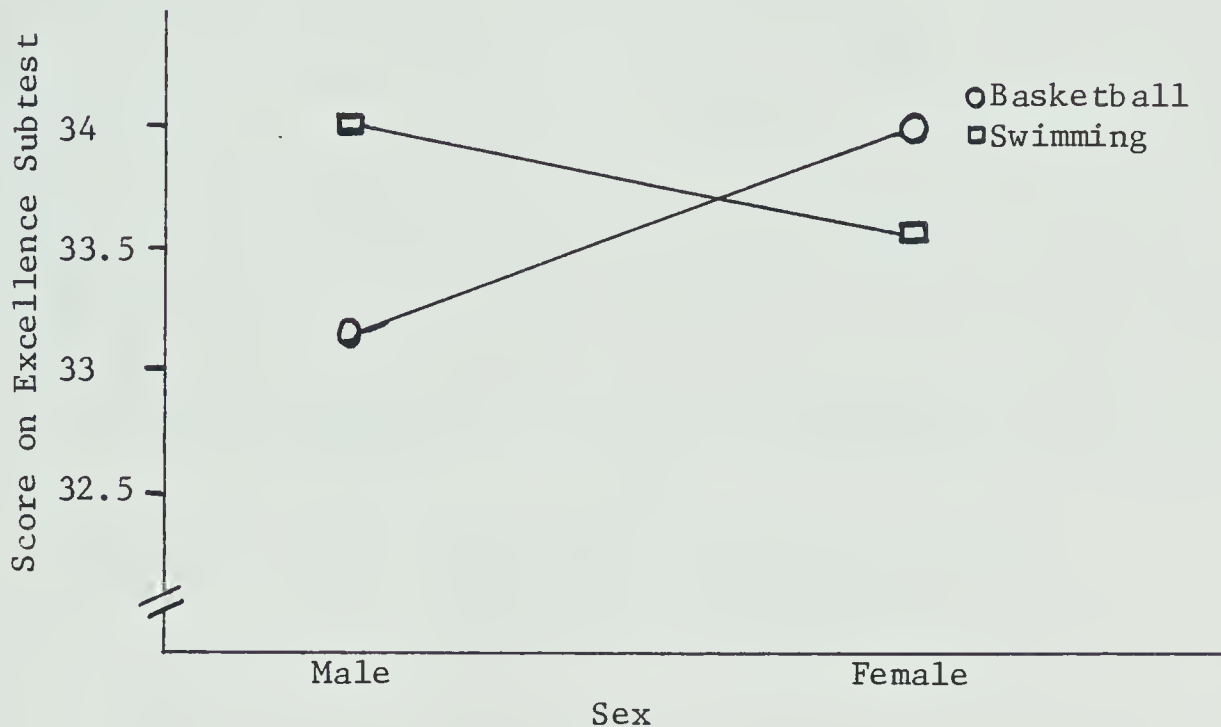


Figure 6. Sport x Sex Interaction Means for the IMI Subtest of Excellence

Significant results were obtained on the sex factor and sport x sex interaction factor for the IMI subtest of success. Figures 7 and 8 respectively illustrate this significant disordinal and ordinal sport x sex interaction. Scheffé contrasts resulted in significant differences between all comparisons of the subgroups except for the comparison between male athletes in basketball and swimming. Figure 8 shows that male athletes in basketball and swimming scored significantly higher than female athletes in these two sports. Thus, it is appropriate to also interpret the significant main effect of sex.

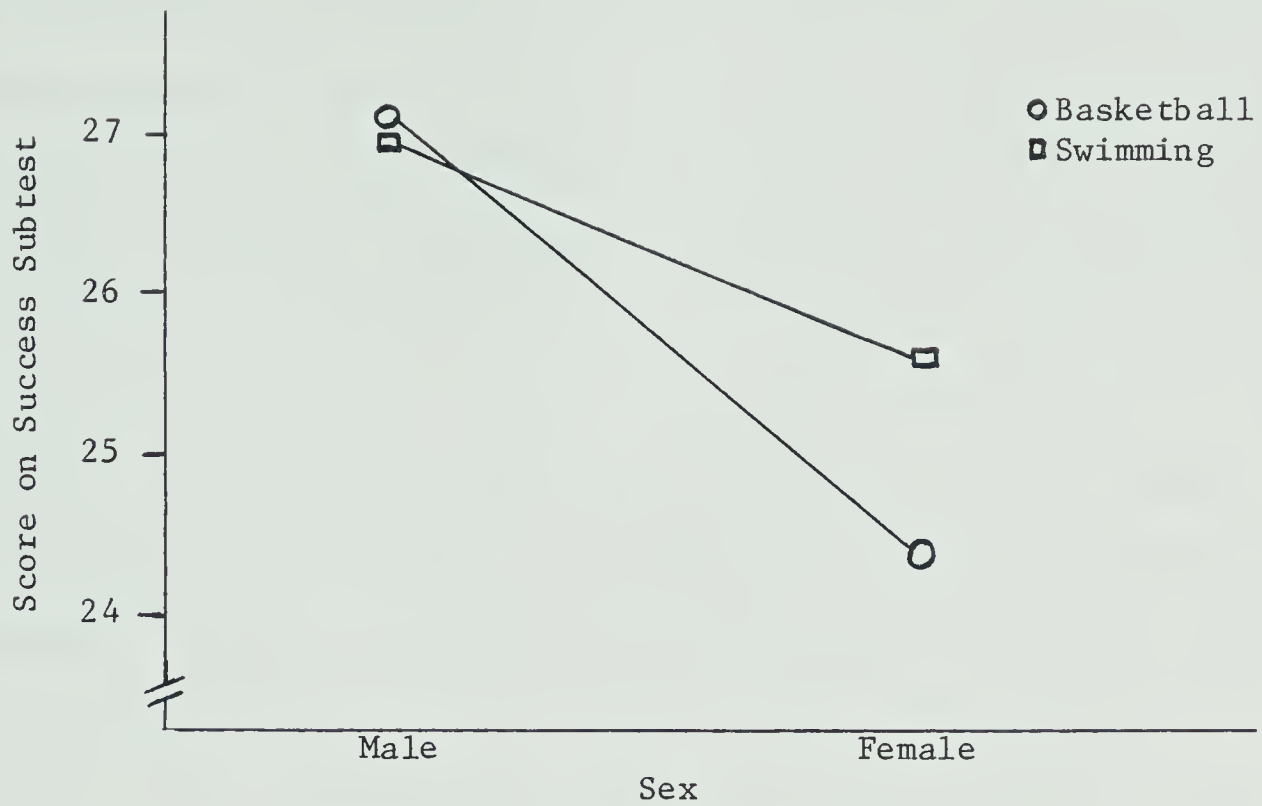


Figure 7. Sport x Sex Interaction Means for the IMI Subtest of Success

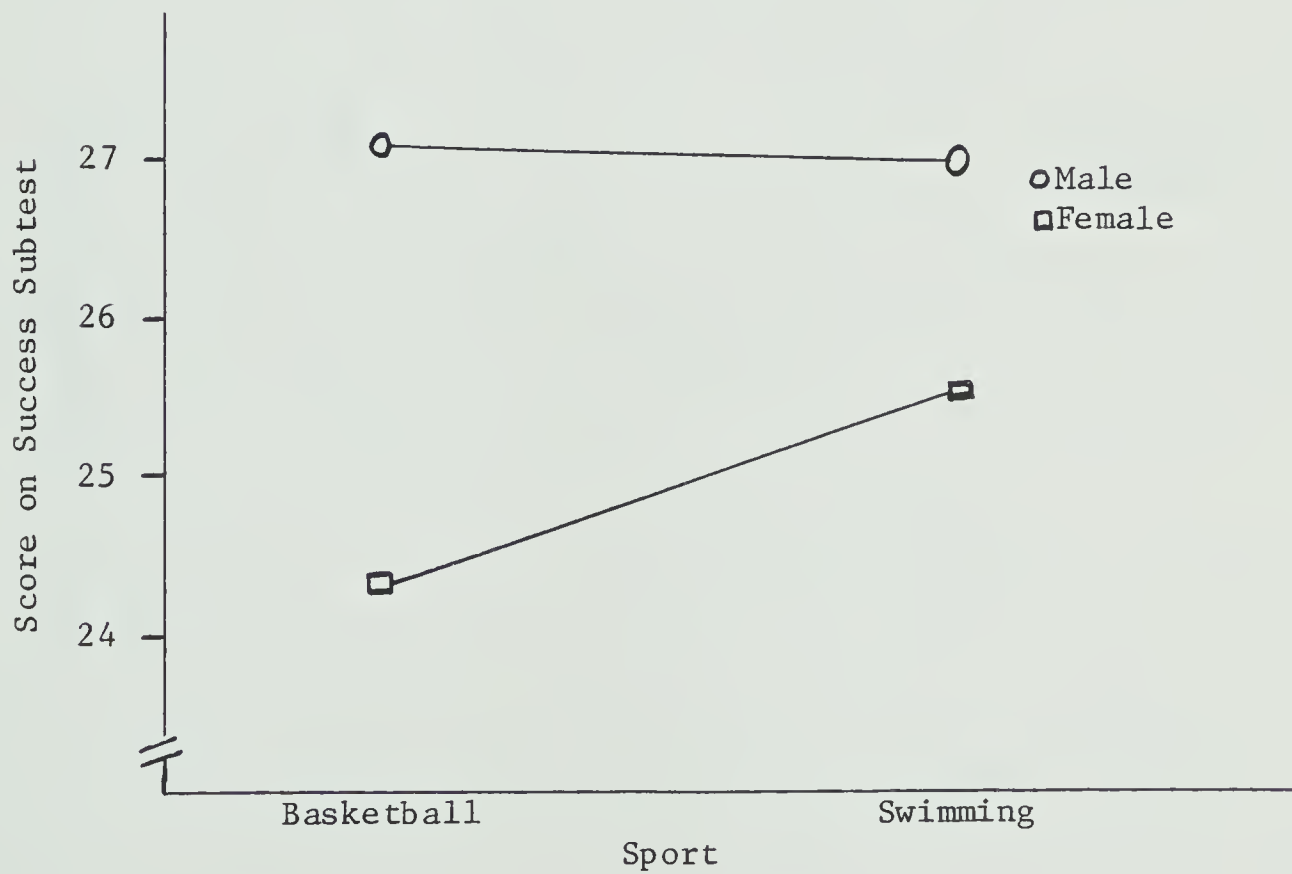


Figure 8. Sport x Sex Interaction Means for the IMI Subtest of Success

Significant results were obtained on the sport, sex, and sport x sex interaction factors for the IMI subtest of aggression. Figures 9 and 10 illustrate this significant ordinal interaction. Scheffé contrasts resulted in significant differences between all comparisons of the subgroups except for the comparison of female athletes in basketball and swimming. Figure 9 shows that it is appropriate to interpret the significant main effect of sport. Males and females in basketball scored significantly higher than males and females in swimming. Figure 10 shows it is also appropriate to interpret the significant main effect of sex. Male athletes in basketball and swimming scored significantly higher than female athletes in these two sports.

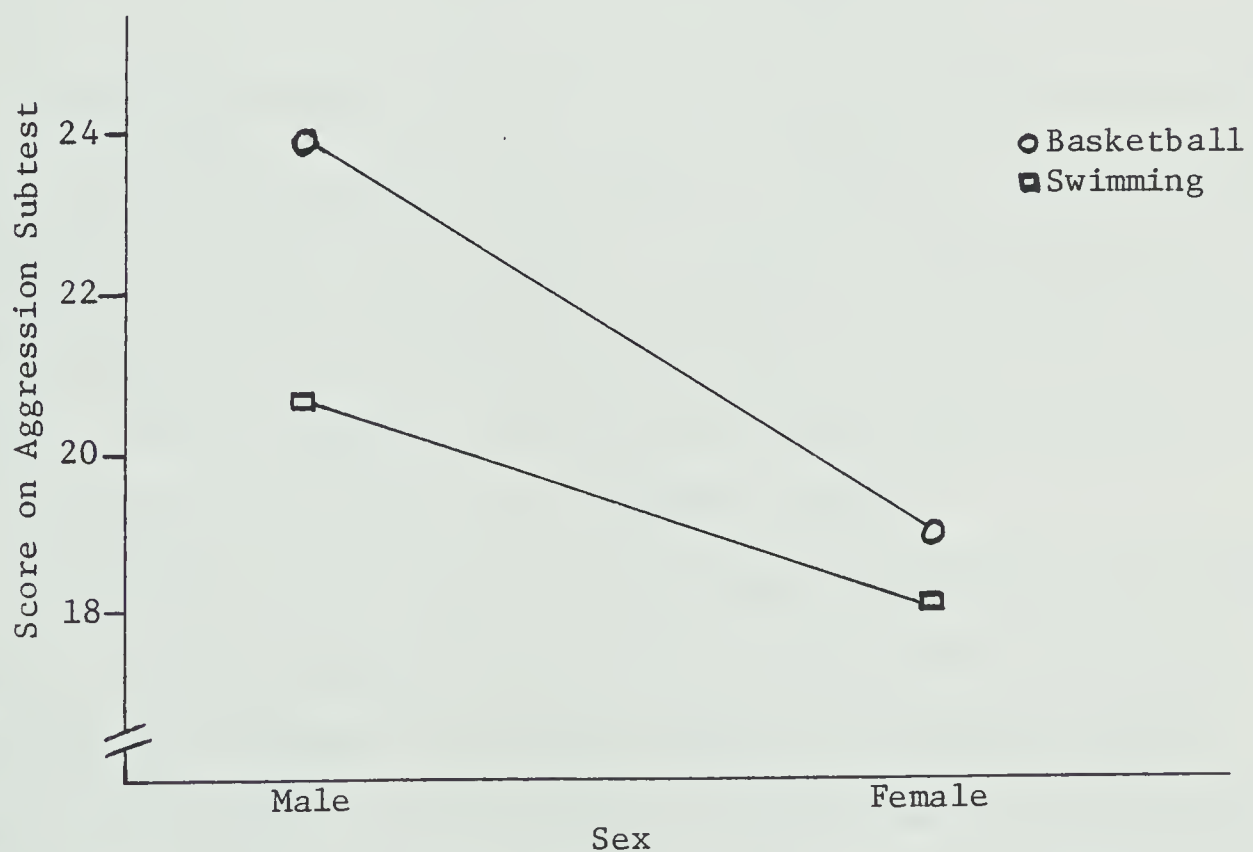


Figure 9. Sport x Sex Interaction Means for the IMI Subtest of Aggression

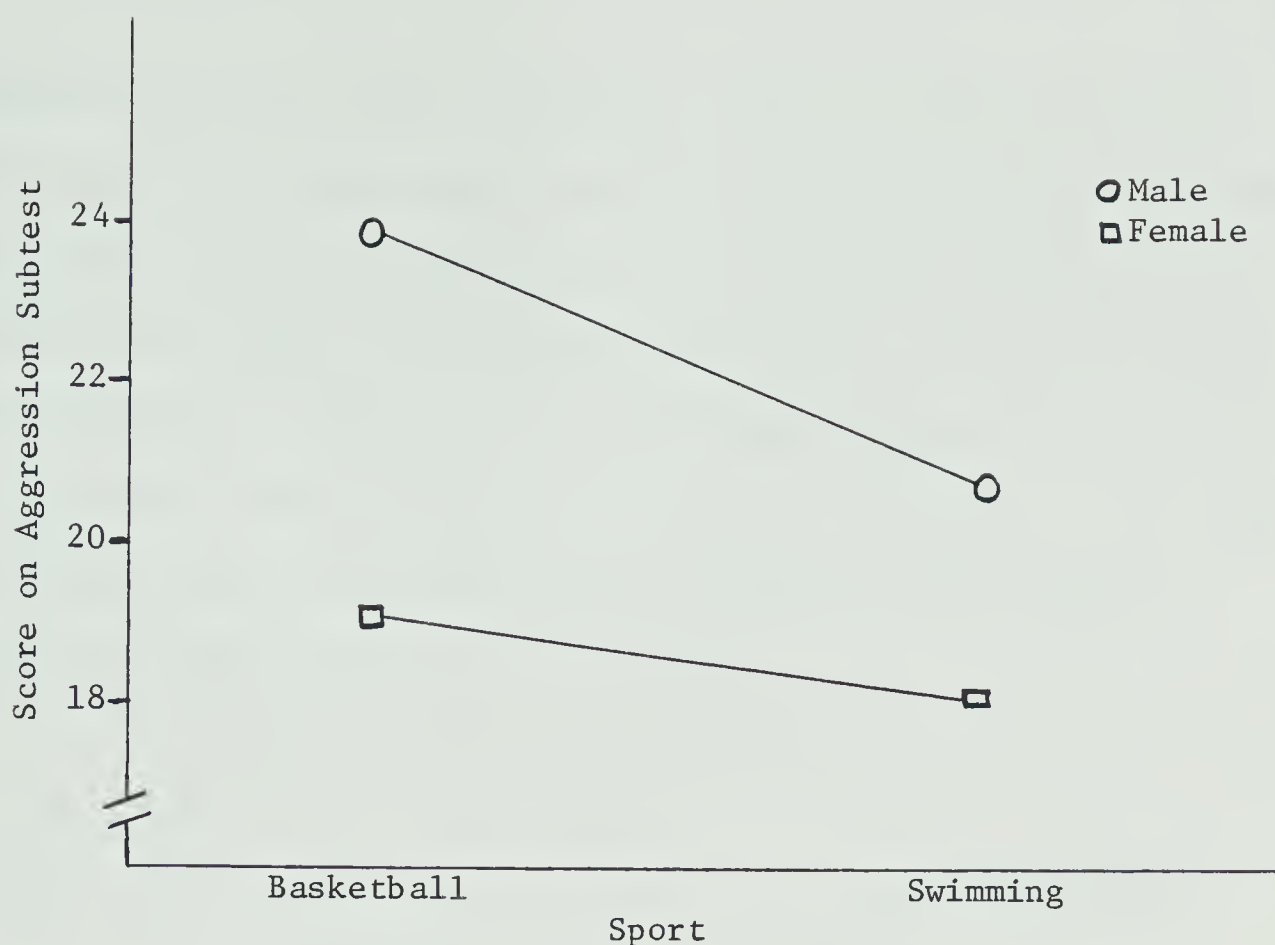


Figure 10. Sport x Sex Interaction Means for the IMI Subtest of Aggression

Significant results were obtained on the sport x sex interaction factor for the IMI subtest of affiliation. Figure 11 illustrates this significant disordinal interaction. Scheffé contrasts resulted in only one significant difference between all comparisons of the subgroups. Female basketball players scored significantly higher on the affiliation scale than male basketball players.

To summarize, there were no significant differences on the IMI subtests of excellence and stress for male and female athletes in basketball and swimming. Males and females in basketball scored significantly higher on the subtests of independence and aggression than males and females in swimming. Male athletes in basketball and swimming scored significantly higher on the subtests of power, success,

and aggression than female athletes in these two sports. As well, female swimmers scored significantly higher on the subtest of success than female basketball players; and male basketball players scored significantly higher on the subtest of aggression than male swimmers. Female basketball players scored significantly higher on the subtest of affiliation than male basketball players. This was the only significant difference on the IMI subtest of affiliation for the four subgroups of athletes.

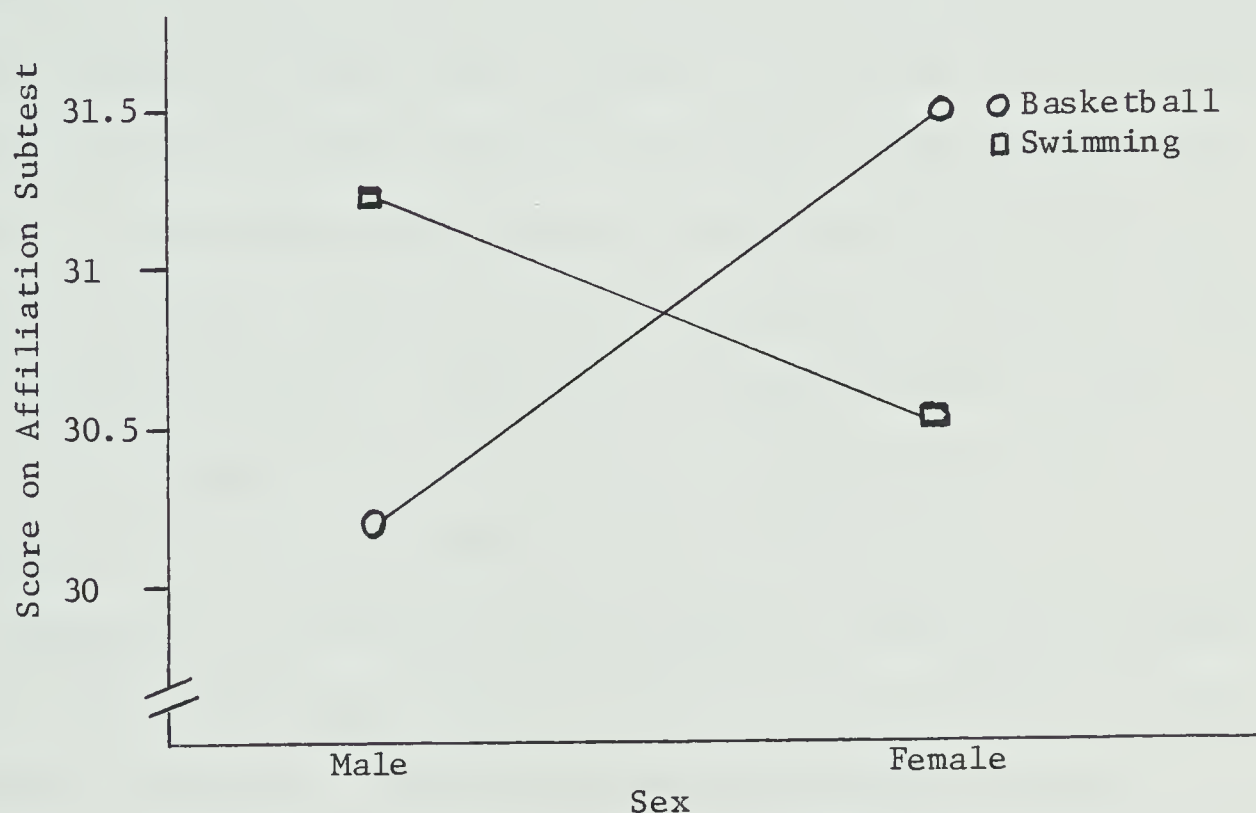


Figure 11. Sport x Sex Interaction Means for the IMI Subtest of Affiliation

A cautionary note must be initially added to these interpretations of the two-way analysis of variance on each of the IMI subtests. It must be realized that, although each subtest was analyzed separately, the study was, in fact, carried out on one large group of athletes tested on all subtests at the same time and not on separate groups of

athletes tested on specific IMI subtests. Thus significant differences on specific subtests for the subgroups of athletes could have been a result of the intercorrelations of the subtests. Therefore, it became necessary to examine the intercorrelations of the subtests for the group of all subjects and the four subgroups of athletes (Appendix B).

The intercorrelations of note were those of the power, success, and aggression subtests. These correlations ranged from .32 to .49. Although these correlations were not extremely high, it should be recalled that significant differences were reported between male and female athletes on these three subtests. It should also be recalled that the principal-axis factoring and varimax rotation of the IMI scales for the group of all subjects and for each of the four subgroups of athletes resulted in the identification of a factor labelled by the scales of power, success, and aggression (supra, p. 168).

The IMI subtests were also analyzed together as one unit. A summary of the two-way multivariate analysis of variance is presented in Appendix E. The results from this analysis essentially provided support for those results reported from the seven separate two-way analyses of variance. From the two-way multivariate analysis of variance, significant results were obtained on the sport, sex, and sport x sex interaction factors. Multiple comparisons on the IMI subtests revealed that the significant sport effect could be attributed to the aggression subtest and the significant sex effect could be attributed to the subtests of power, success, and aggression. Multiple comparisons on the IMI subtests did not result in any significant differences for the significant sport x sex interaction factor.

Thus, although the combination of the seven IMI subtests resulted in a significant sport x sex interaction, a lesser subset of these seven subtests did not produce any significant interaction.

The majority of the differences reported on the IMI subtests for the four subgroups of athletes may have been expected. For example, male and female athletes in the contact sport of basketball may have been expected to score higher on aggression than athletes in the noncontact sport of swimming. It would appear that basketball lends itself to more obvious opportunities for both physical and psychological aggression than does swimming. As well, it may have been expected for male athletes in basketball and swimming to score higher on power, success, and aggression--especially power and aggression--than female athletes in these two sports. The one unexpected result for which no reasonable explanation can be provided was male and female athletes in basketball scoring higher on independence than male and female athletes in swimming.

In a study of attitudes toward physical activity, Alderman (1970) reported that female athletes from a number of sports scored significantly higher on the social experience dimension (affiliation) than male athletes. He also reported that male athletes scored significantly higher on the vertigo dimension (related to the stress system) than female athletes. However, in the present study, although female basketball players scored significantly higher on the affiliation incentive system than male basketball players, there was not a general sex difference on this subtest. As well, in the present study, there were no significant differences between males and females on the

stress subtest.

Looking at the power motive, Winter (1973) reported that, in contrast to male undergraduate non-athletes, male athletes in directly competitive sports (e.g., basketball) scored higher on n Power whereas athletes in nondirectly competitive sports (e.g., swimming) did not. However, Nell and Strümpfer (1978) reported no differences in n Power scores of male undergraduate students as a function of sports participated in, number of sports played, or frequency of playing. In the present study, male athletes scored significantly higher on the power incentive system than female athletes but there were no significant differences between male athletes in basketball and swimming.

Frodi et al. (1977) reported that no definite conclusion can be set forth concerning sex-related differences in response preference of aggression. Their review of the experimental literature did not support commonly held hypotheses that men are always more physically aggressive than women and that women display more indirect aggression. In the present study, males scored significantly higher than females on the aggression incentive system and males and females in basketball scored significantly higher on the aggression incentive system than males and females in swimming. As well, male basketball players scored significantly higher on the aggression subtest than female basketball players, male swimmers, and female swimmers; and male swimmers scored significantly higher on the aggression subtest than female basketball players and female swimmers.

These discrepancies in results between the motive and incentives of each of the systems of power and aggression appear to lend support

to the justifiable need to use sport-specific instruments to obtain accurate, consistent, and meaningful information on the behavior of athletes in competitive sport situations. As well, from the results presented, it appears that the IMI is sufficiently specific to successfully study incentive systems operating in competitive sport. It does not appear, at this time, that it would be either necessary or useful to develop scales to measure incentives specific to a sport or to study specific incentives more in-depth within sport situations.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

The primary purpose of the study was to assess the construct validity of The Alberta Incentive Motivation Inventory (IMI). The IMI contains seven subscales assessing excellence, power, stress, independence, success, aggression, and affiliation incentives in sport. A secondary purpose was to determine if differences existed of any of the seven incentive systems for male and female athletes in basketball and swimming.

Subjects who participated in this study were 400 male and female athletes in basketball and swimming. Specifically, the subjects were 200 competitive basketball players--100 of each sex and 200 competitive swimmers--100 of each sex. These subjects ranged in age from 11 to 15 years.

Each athlete completed the IMI and the Personality Research Form E (PRF-E). The PRF-E was used as the major validation instrument. Two major independent statistical analyses were used to examine the construct validity of the IMI. These analyses were: 1) correlational method as outlined by Campbell and Fiske (1959) and 2) principal-axis factoring, varimax rotation, and orthogonal procrustean transformation. Two-way analyses of variance were used to examine group differences on the seven incentive systems.

Based on the correlational method the construct validity of all

seven scales of the IMI was acceptable. Based on the factor analytic method the construct validity of all the IMI scales except for the excellence scale was acceptable. Thus, the use of seven and six scales of the IMI respectively to measure sport-specific constructs across sport groups was supported. The seven scales of the IMI were: excellence, power, stress, independence, success, aggression, and affiliation.

There were no significant differences on the IMI subtests of excellence and stress for male and female athletes in basketball and swimming. Males and females in basketball scored significantly higher on the subtests of independence and aggression than males and females in swimming. Male athletes in basketball and swimming scored significantly higher on the subtests of power, success, and aggression than female athletes in these two sports. As well, female swimmers scored significantly higher on the subtest of success than female basketball players; and male basketball players scored significantly higher on the subtest of aggression than male swimmers. Female basketball players scored significantly higher on the subtest of affiliation than male basketball players. This was the only significant difference on the IMI subtest of affiliation for the four subgroups of athletes.

Conclusions

Based on the results of the present study, the following conclusions can be drawn:

1. Based on the correlational method as outlined by Campbell

and Fiske (1959) the construct validity of all seven scales of the IMI was acceptable. Based on the factor analytic method the construct validity of all the IMI scales except for the excellence scale was acceptable. Thus, the use of seven and six scales of the IMI respectively to measure sport-specific constructs across sport groups was supported. The seven scales of the IMI were: excellence, power, stress, independence, success, aggression, and affiliation.

2. The null hypothesis for testing the sub-problem was rejected as significant differences existed with many of the seven incentive systems for male and female athletes in basketball and swimming. The two most notable were: a) male and female athletes in basketball scored significantly higher on the subtests of independence and aggression than male and female athletes in swimming; and b) male athletes in basketball and swimming scored significantly higher on the subtests of power, success, and aggression than female athletes in these two sports.

Recommendations for Further Study

Based on the results of the present study, the following recommendations are made for further research:

1. Future analysis of multi-incentive-multimethod matrices of intercorrelations should utilize maximum-likelihood estimates for evaluation of Campbell and Fiske (1959) criteria.

2. Future research with the IMI should consider a careful assessment of the items of each of the scales.

3. Future research with the IMI should consider the present structure of this inventory with consideration given to restructuring the inventory to assess only the incentives of excellence, affiliation, stress, and success.

4. Future research with the IMI should study athletes in sports other than basketball and swimming and of ages other than 11-15 years. Consideration should be given to examining both sport and sex differences within the incentive systems.

5. Future research with the IMI should consider the development of norms.

6. Future research with the IMI should assess the relationships of the constructs measured by the IMI with other psychological constructs and performance and behavioral measures.

7. Further research on the motivations of athletes should use instruments designed specifically for use in the sports environment.

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Appendix A

THE ALBERTA IMI

Instructions:

This is a questionnaire that is designed to assess what attitudes you have toward competitive sport and how you feel about yourself as a competitive athlete. It is of utmost importance that you answer these questions as truthfully as you can, so that the assessment of your answers can be a valid and reliable one. There are, of course, no right or wrong answers and it is particularly important for you not to try and represent a person other than yourself.

Read one statement at a time. Decide which one of the four available responses to each statement best represents the way you feel. The four available responses are: always, often, seldom, or never. Then simply write your answer on the separate answer sheet in the correct space with your pencil. When writing your answers on the answer sheet, please be sure that the number of the statement you have just read is the same as the number on the answer sheet. Work as quickly as you can. Your first reaction to each statement is usually the most accurate one. Don't think too long over a statement in order to try and "figure out" how you feel. Just answer quickly, and please be sure to answer all of the questions.

1. In sport, doing the best I possibly can is more important than anything else.
2. It's important to make your teammates agree with you.
3. Hard workouts in practices are pleasant for me.
4. I would rather go without help when training.
5. Public criticism of my playing bothers me.
6. In some sports, such as football and hockey, injuring an opponent in order to win is partially approved of. If the opportunity existed in your sport, would you do the same?
7. Close friendships with my teammates are necessary for me.
8. Working hard to perfect my individual skills is what counts in sport.
9. I like telling my teammates what to do.
10. High pressure situations in sport are fun.
11. I prefer to compete alone, without lots of spectators watching me.
12. When I participate in sport, my objective is to win.
13. I like to intimidate my opponents.
14. Being accepted by my teammates is more important to me than winning.
15. The better I play, the more I like myself.
16. I take a strong stand in arguments with my coach.
17. The more complicated a sport is, the more I like it.
18. I don't care if my teammates dislike me.
19. I like to see my name in the sports section of the newspaper.
20. When frustrated, I become even more angry.
21. I can be friendly with teammates who do things which I consider are wrong.
22. Playing well is more important than winning.
23. I like being chosen to demonstrate in front of the team.
24. I enjoy being "uptight" before and during a game.

25. I couldn't care less if I make friends in my sport.
26. I like competing in front of large crowds of people.
27. I enjoy the opportunity to humiliate my opponents.
28. I enjoy my participation in sport just to be with other people.
29. I get very upset with myself when I don't play as well as I am able to.
30. Being a leader on the team is more important than winning.
31. I like doing new things in my sport.
32. I like to train alone.
33. Winning in sport is the most important thing even when I play badly.
34. Punishment of one's opponents is quite natural in sport.
35. Taking part in team affairs is important to me.
36. Practicing really hard is what makes great athletes.
37. I think people notice me when I participate in sport.
38. Not knowing whether I'm going to win or lose before a game is attractive to me.
39. I dislike being asked for advice by my teammates.
40. Games are more important than practices.
41. Releasing my frustrations is more important to me than winning.
42. I want to be considered friendly by my teammates and coach.
43. I blame myself when I play badly.
44. Coaches give me too much advice.
45. I like lots of noise while I'm playing.
46. It's fine with me when no one cares how well I play.
47. I dislike losing.
48. I don't feel sorry for my opponents when I beat them.
49. A warm, friendly atmosphere on the team is important to me.

50. I would rather learn the difficult things in my sport than the easy ones.
51. Winning arguments with my teammates is important to me.
52. Drills bore me.
53. I would rather lose than accept advice from my coach or teammates.
54. I participate in sport because my parents want me to.
55. One should beat inferior opponents as badly as possible.
56. I like to train with other people.
57. I practice new skills until I can do them perfectly.
58. I believe I am the most important person on the team.
59. Excitement in a game is more important than winning.
60. I don't like my parents being around when I'm competing.
61. The score is important in a game.
62. Competitive sport is a "dog-eat-dog" situation.
63. I get very upset when my teammates or my coach reject me.
64. I give 100% no matter who my opponent is.
65. I like it when my teammates depend on me during a game.
66. I like variety in practices.
67. Listening to my coach is a waste of time.
68. I would like to be a well-known athlete.
69. Heckling an opponent when you've beaten him is alright.
70. The only reason I participate in sport is to make friends.

IMI ANSWER SHEET

Name: _____

Age: _____

Sex: _____

Sport: _____

Instructions: Write your answer to each statement
in the correct blank. Your answer
is restricted to one of four choices:

ALWAYS OFTEN SELDOM NEVER

- | | | | | |
|-----------|-----------|-----------|-----------|-----------|
| 1. _____ | 2. _____ | 3. _____ | 4. _____ | 5. _____ |
| 6. _____ | 7. _____ | 8. _____ | 9. _____ | 10. _____ |
| 11. _____ | 12. _____ | 13. _____ | 14. _____ | 15. _____ |
| 16. _____ | 17. _____ | 18. _____ | 19. _____ | 20. _____ |
| 21. _____ | 22. _____ | 23. _____ | 24. _____ | 25. _____ |
| 26. _____ | 27. _____ | 28. _____ | 29. _____ | 30. _____ |
| 31. _____ | 32. _____ | 33. _____ | 34. _____ | 35. _____ |
| 36. _____ | 37. _____ | 38. _____ | 39. _____ | 40. _____ |
| 41. _____ | 42. _____ | 43. _____ | 44. _____ | 45. _____ |
| 46. _____ | 47. _____ | 48. _____ | 49. _____ | 50. _____ |
| 51. _____ | 52. _____ | 53. _____ | 54. _____ | 55. _____ |
| 56. _____ | 57. _____ | 58. _____ | 59. _____ | 60. _____ |
| 61. _____ | 62. _____ | 63. _____ | 64. _____ | 65. _____ |
| 66. _____ | 67. _____ | 68. _____ | 69. _____ | 70. _____ |

Appendix B

INTERCORRELATIONS OF MULTI-INCENTIVE-MULTIMETHOD MATRICES (IMI WITH PRF-E)

Table 46
Intercorrelations of IMI and PRF-E Scales for All Subjects

Scales	1	2	3	4	5	6	7	IMI	1	2	3	4	5	6	7
1	.691								1	.694					
2	-.027	.619							2	.277	.809				
3	.188	.211	.624						3	.194	.107	.601			
4	-.212	.083	-.025	.691					4	-.040	.074	.051	.688		
5	.088	.404	-.044	-.056	.736				5	.049	.192	-.039	-.154	.629	
6	-.022	.413	.056	.245	.435	.748			6	-.106	.202	-.115	.201	.205	.791
7	.355	.053	.290	-.306	.005	-.098	.671		7	.211	.180	.169	-.297	.114	-.053
															.665
1	.243	.112	.177	-.012	-.013	-.056	.109								
2	.080	.442	.199	.018	.271	.246	.030								
3	.106	.063	.229	-.095	-.018	-.118	.097								
4	-.111	.098	.059	.232	.120	.187	.237								
5	.090	.185	.036	-.042	.234	.178	.135								
6	-.067	.179	-.041	.131	.214	.395	-.128								
7	.196	-.004	.172	-.229	-.062	-.163	.305								

Note. Scales of IMI: 1--excellence, 2--power, 3--stress, 4--independence, 5--success, 6--aggression, and 7--affiliation.
Scales of PRF-E: 1--achievement, 2--dominance, 3--change, 4--autonomy, 5--social recognition, 6--aggression, and 7--affiliation.

Table 48
Intercorrelations of IMI and PRF-E Scales for Female Basketball Players

Scales	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	.540							.753						
2	.108	.728						.175	.802					
3	.175	.263	.534					.298	.244	.577				
4	-.124	.160	-.129	.509				.044	-.001	.159	.749			
5	.104	.319	.139	.016	.596			-.060	.268	-.049	-.020	.451		
6	.018	.488	.146	.202	.406	.844		-.076	.097	-.195	.125	.038	.852	
7	.200	.076	.358	-.249	.024	-.108	.664	.085	.247	.298	-.172	.178	-.006	.653
1	.313	.185	.076	.003	-.119	-.087	.088							
2	.067	.408	.132	.053	.157	.147	.016							
3	.113	.237	.408	-.163	.069	.015	.173							
4	.131	.083	.057	.050	.045	.164	-.112							
5	.092	.180	-.035	.115	.217	.180	.023							
6	-.042	.087	-.051	.062	.124	.315	-.261							
7	.018	.183	.175	-.162	.012	-.002	.184							



Table 49
Intercorrelations of IMI and PRF-E Scales for Male Swimmers

Scales	1	2	3	IMI 4	5	6	7	1	2	3	4	5	6	7
IMI														
1	.610							.763						
2	-.089	.468						.349	.783					
3	.169	.115	.676					.143	.051	.421				
4	-.180	-.065	-.152	.691				-.153	.026	-.001	.563			
5	-.121	.286	-.066	.021	.712			.055	.095	.065	-.171	.527		
6	-.183	.336	-.185	.338	.422	.699		-.108	.250	-.014	.129	.382	.819	
7	.309	.092	.276	-.284	-.103	-.105	.608	.334	.121	.181	-.403	.077	-.080	.715
PRF-E														
1	.314	.035	.137	-.081	-.032	-.351	.054							
2	-.106	.438	.160	.021	.200	.110	-.110							
3	.206	.075	.221	-.120	-.066	-.164	.244							
4	-.133	-.024	.062	.302	.173	.233	-.304							
5	.011	.204	-.030	-.150	.078	.169	.159							
6	-.089	.219	-.084	.097	.194	.410	-.014							
7	.246	-.007	.190	-.195	-.230	-.219	.317							

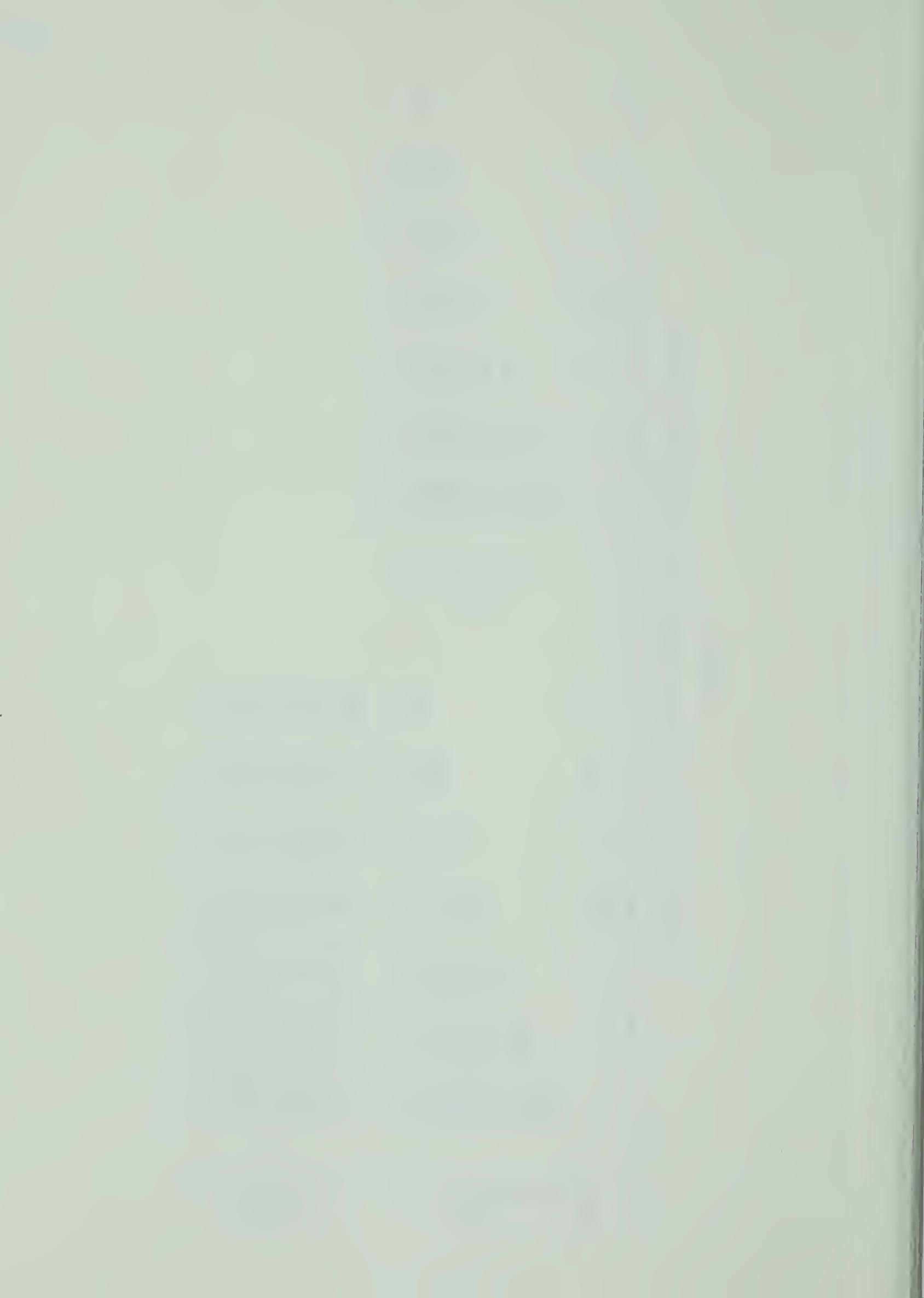


Table 50
Intercorrelations of IMI and PRF-E Scales for Female Swimmers

Scales	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	.801							.648						
2	.039	.714						.308	.835					
3	.220	.344	.612					.234	.063	.686				
4	-.323	.130	.047	.757				-.019	.042	.071	.708			
5	.277	.405	.002	-.091	.791			-.061	.116	-.001	-.220	.827		
6	.055	.247	.200	.147	.299	.649		-.119	.162	-.083	.343	.033	.740	
7	.515	.194	.333	-.330	.170	.047	.767	.323	.259	.160	-.124	.003	-.050	.625
1	.201	.066	.308	-.031	-.005	.170	.093							
2	.168	.450	.180	-.005	.215	.197	.148							
3	.088	.062	.238	-.142	.096	.032	.091							
4	-.252	-.015	-.020	.324	-.039	-.022	-.161							
5	.160	.257	.090	.011	.284	.106	.214							
6	-.035	.105	-.130	.124	.102	.240	-.024							
7	.416	.112	.263	-.268	.137	.107	.409							



Appendix C

FACTOR LOADING MATRICES FROM ORTHOGONAL PROCRUSTEAN TRANSFORMATIONS

Table 51

Factor Loading Matrix from Orthogonal Procrustean
Transformation of IMI Scales for All Subjects

Scale	Factor		
	1	2	3
1	-.007	-.533	.437
2	.703	.133	.321
3	-.014	.144	.872
4	.084	.842	.018
5	.831	-.252	-.009
6	.773	.239	.084
7	-.114	-.495	.615

Table 52

Factor Loading Matrix from Orthogonal Procrustean
Transformation of IMI Scales for Male Basketball Players

Scale	Factor		
	1	2	3
1	.062	.490	.509
2	.722	-.092	-.053
3	.105	.070	.847
4	.028	-.843	.342
5	.801	.251	-.020
6	.780	-.173	.121
7	-.105	.732	.268

Table 53

Factor Loading Matrix from Orthogonal Procrustean
Transformation of IMI Scales for Female Basketball Players

Scale	Factor		
	1	2	3
1	.294	.765	-.152
2	.704	-.118	.375
3	.186	.236	.783
4	.253	-.662	-.068
5	.734	.178	-.055
6	.795	-.221	.101
7	-.131	.461	.670

Table 54

Factor Loading Matrix from Orthogonal Procrustean
Transformation of IMI Scales for Male Swimmers

Scale	Factor		
	1	2	3
1	-.235	.232	.706
2	.759	.263	.032
3	.022	.476	.412
4	.074	-.869	.261
5	.740	-.023	-.141
6	.731	-.462	.152
7	.022	.528	.573

Table 55

Factor Loading Matrix from Orthogonal Procrustean
Transformation of IMI Scales for Female Swimmers

Scale	Factor		
	1	2	3
1	.146	.764	.226
2	.678	-.076	.389
3	.123	.034	.905
4	.161	-.775	.168
5	.828	.318	-.225
6	.670	-.142	.141
7	.091	.686	.487

Appendix D

SUMMARIES OF THE TWO-WAY ANALYSES OF VARIANCE AND THE SCHEFFÉ CONTRASTS ON THE IMI SUBTESTS

Table 56

Summary of Two-Way Analysis of Variance on the IMI Subtest of Excellence

Source	Sum of Squares	df	Mean Squares	F Ratio	Probability
A (Sport)	5.00	1	5.00	.47	.491
B (Sex)	4.13	1	4.13	.39	.532
AB	39.69	1	39.69	3.77	.053
E (Within)	4171.31	396	10.53		

Table 57

Summary of Scheffé Contrasts on Sport x Sex Interaction Means for the IMI Subtest of Excellence

Male Basketball Players (A ₁ B ₁)	Female Basketball Players (A ₁ B ₂)	Male Swimmers (A ₂ B ₁)	Female Swimmers (A ₂ B ₂)	Mean Difference ^a
33.15	33.98			.83
33.15		34.00		.85
33.15			33.57	.42
	33.98	34.00		.02
	33.98		33.57	.41
		34.00	33.57	.43

^aMean Differences of 1.28 and 1.15 were required for significance at the .05 and .10 levels respectively.

Table 58

Summary of Two-Way Analysis of Variance
on the IMI Subtest of Power

Source	Sum of Squares	df	Mean Squares	F Ratio	Probability
A (Sport)	.13	1	.13	.01	.916
B (Sex)	438.94	1	438.94	39.24	.000
AB	18.94	1	18.94	1.69	.194
E (Within)	4429.69	396	11.19		

Table 59

Summary of Two-Way Analysis of Variance
on the IMI Subtest of Stress

Source	Sum of Squares	df	Mean Squares	F Ratio	Probability
A (Sport)	19.56	1	19.56	1.67	.198
B (Sex)	13.06	1	13.06	1.11	.292
AB	8.38	1	8.38	.71	.399
E (Within)	4652.19	396	11.75		

Table 60

Summary of Two-Way Analysis of Variance
on the IMI Subtest of Independence

Source	Sum of Squares	df	Mean Squares	F Ratio	Probability
A (Sport)	81.94	1	81.94	8.94	.003
B (Sex)	8.19	1	8.19	.89	.345
AB	.50	1	.50	.05	.815
E (Within)	3631.25	396	9.17		

Table 61

Summary of Two-Way Analysis of Variance
on the IMI Subtest of Success

Source	Sum of Squares	df	Mean Squares	F Ratio	Probability
A (Sport)	43.69	1	43.69	3.18	.075
B (Sex)	497.38	1	497.38	36.22	.000
AB	54.81	1	54.81	3.99	.046
E (Within)	5437.94	396	13.73		

Table 62

Summary of Scheffé Contrasts on Sport x Sex Interaction
Means for the IMI Subtest of Success

Male Basketball Players (A ₁ B ₁)	Female Basketball Players (A ₁ B ₂)	Male Swimmers (A ₂ B ₁)	Female Swimmers (A ₂ B ₂)	Mean Difference ^a
27.12	24.15			2.97**
27.12		27.04		.08
27.12			25.55	1.57**
	24.15	27.04		2.89**
	24.15		25.55	1.40*
		27.04	25.55	1.49**

^aMean Differences of 1.46 and 1.31 were required for significance at the .05 and .10 levels respectively.

*p < .10

**p < .05

Table 63

Summary of Two-Way Analysis of Variance
on the IMI Subtest of Aggression

Source	Sum of Squares	df	Mean Squares	F Ratio	Probability
A (Sport)	424.44	1	424.44	23.27	.000
B (Sex)	1376.50	1	1376.50	75.47	.000
AB	130.00	1	130.00	7.13	.008
E (Within)	7222.88	396	18.24		

Table 64

Summary of Scheffé Contrasts on Sport x Sex Interaction
Means for the IMI Subtest of Aggression

Male Basketball Players (A ₁ B ₁)	Female Basketball Players (A ₁ B ₂)	Male Swimmers (A ₂ B ₁)	Female Swimmers (A ₂ B ₂)	Mean Difference ^a
23.85	19.00			4.85**
23.85		20.65		3.20**
23.85			18.08	5.77**
	19.00	20.65		1.65*
	19.00		18.08	.92
		20.65	18.08	2.57**

^aMean Differences of 1.68 and 1.51 were required for significance at the .05 and .10 levels respectively.

*p < .10

**p < .05

Table 65

Summary of Two-Way Analysis of Variance
on the IMI Subtest of Affiliation

Source	Sum of Squares	df	Mean Squares	F Ratio	Probability
A (Sport)	.25	1	.25	.02	.888
B (Sex)	10.44	1	10.44	.82	.365
AB	105.94	1	105.94	8.35	.004
E (Within)	5025.56	396	12.69		

Table 66

Summary of Scheffé Contrasts on Sport x Sex Interaction
Means for the IMI Subtest of Affiliation

Male Basketball Players (A ₁ B ₁)	Female Basketball Players (A ₁ B ₂)	Male Swimmers (A ₂ B ₁)	Female Swimmers (A ₂ B ₂)	Mean Difference ^a
30.17	31.52			1.35*
30.17		31.19		1.02
30.17			30.48	.31
	31.52	31.19		.33
	31.52		30.48	1.04
		31.19	30.48	.71

^aMean Differences of 1.41 and 1.26 were required for significance at the .05 and .10 levels respectively.

*p < .10

Appendix E

SUMMARY OF THE TWO-WAY MULTIVARIATE ANALYSIS OF VARIANCE AND THE MULTIPLE COMPARISONS ON THE IMI SUBTESTS

Table 67

Summary of Two-Way Multivariate Analysis of Variance on the IMI Subtests

Source	df	F Ratio ^a	Probability
A (Sport)	7,390	6.37	.000
B (Sex)	7,390	13.25	.000
AB	7,390	2.91	.006

^aF Ratio computed using Rao's F Approximation Test to Wilks' Lambda.

Table 68

Summary of Multiple Comparisons of the IMI Subtests for A (Sport) Main Effect

IMI Subtest	df	F Ratio	Probability
Excellence	7,390	.07	1.000
Power	7,390	.00	1.000
Stress	7,390	.23	.977
Independence	7,390	1.26	.271
Success	7,390	.45	.873
Aggression	7,390	3.27	.002
Affiliation	7,390	.00	1.000

Table 69

Summary of Multiple Comparisons of the IMI
Subtests for B (Sex) Main Effect

IMI Subtest	df	F Ratio	Probability
Excellence	7,390	.05	1.000
Power	7,390	5.52	.000
Stress	7,390	.16	.993
Independence	7,390	.12	.997
Success	7,390	5.10	.000
Aggression	7,390	10.62	.000
Affiliation	7,390	.11	.997

Table 70

Summary of Multiple Comparisons of the IMI Subtests
for Sport x Sex Interaction Effect

IMI Subtest	df	F Ratio	Probability
Excellence	7,390	.53	.812
Power	7,390	.24	.976
Stress	7,390	.10	.998
Independence	7,390	.00	1.000
Success	7,390	.56	.788
Aggression	7,390	1.00	.429
Affiliation	7,390	1.18	.315

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